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Construction Costs for Municipal Wastewater Conveyance Systems 1973-1977

Dames and Moore, Denver, Colo

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The purpose of this study was to collect, categorize and analyze construction bid data for wastewater conveyance systems nationwide with the goal of providing a reference for estimating future facility costs. All facilities sampled are municipally-owned conveyance systems funded after passage of Public Law 92-500. The 455 construction projects sampled included new and enlarged wastewater conveyance facilities. Costs for both collector and interceptor projects were included along with the costs of associated pumping stations and force mains. Costs for cast-in-place sanitary sewer pipe were not available in the projects sampled for this study. In addition to construction costs, data on Step 1, Step 2 and the nonconstruction portion of Step 3 costs were collected and analyzed.

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The three technical reports listed below were prepared in conjunction with the 1976 Update of Needs for Municipal Wastewater Treatment Facilities, a biennial report to the U.S. Congress. This series of reports provide construction cost relationships for wastewater treatment plants and sewers presently under construction and also related operations and maintenance (O&M) cost relationships for existing facilities. The data base for all three studies is representative of the ten regions.

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TECHNICAL REPORT

CONSTRUCTION COSTS FOR MUNICIPAL WASTEWATER CONVEYANCE SYSTEMS: 1973 - 1977

BY

DAMES & MOORE
WATER POLLUTION CONTROL ENGINEERING SERVICES
DENVER, COLORADO

MAY 1978

PREPARED FOR

ENVIRONMENTAL PROTECTION AGENCY
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This report was prepared by Dames & Moore, Water Pollution Control Engineering Services, Denver, Colorado, under the direction of Mr. James A. Chamblee of EPA Headquarters' Municipal Construction Division.

Sincere appreciation is extended to EPA Construction Grants personnel in each of the ten regions. Their advice and assistance was invaluable in accumulating the large quantity of construction bid data contained herein.

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2.0 SUMMARY

The purposes of this study were to collect, categorize and analyze construction bid data for wastewater conveyance systems nationwide with the goal of providing a reference for estimating future facility costs. To accomplish these goals, construction bid information was obtained from the construction grant files in each of the ten EPA regional offices. All facilities sampled are municipally owned conveyance systems funded after passage of Public Law 92-500. The 455 construction projects sampled included new and enlarged wastewater conveyance facilities. Costs for both collector and interceptor projects were included along with the costs of associated pump stations and force mains. Costs for cast-in-place sanitary sewer pipe were not available in the projects sampled for this study. In addition to construction costs, data on Step I, Step II and the non-construction portion of Step III costs were collected and analyzed.

Since, in practice, both grant eligible and ineligible portions of sewer projects are included in EPA grant file bid tabulations, construction costs for both were gathered and analyzed with equal weight in this study. Costs of facilities for treating collected sewage are not included in this report. A parallel document with similar objectives for treatment plants has been published by the Environmental Protection Agency and is entitled "Construction Costs for Municipal Wastewater Treatment Plants 1973-1977", (EPA 430/9-77-013, MCD-37).

Construction costs in this report are presented as dollars per-foot of sewer in-place including both materials and labor. Cost of appurtenances such as manholes, pipe-casing and special bedding are both included in tables for total construction cost and analyzed separately to identify their individual effect on costs. Similarly, costs for Step I, Step II and Step III non-construction items are itemized separately and added into tables for total per-foot construction cost.

All cost data used in this report, except Chapter 7.0 costs, were updated to third quarter 1977 dollars using the EPA Complete Urban Sewer System (CUSS) Index as published quarterly by EPA. Chapter 7.0 costs were updated to first quarter 1978 dollars using the CUSS index.

Care should be taken by the user of cost data presented in this report. Costs for construction of sanitary sewer facilities range widely with variation in one or more of many parameters including labor wage rates, depth of cut and necessity of trench shoring, bedding conditions due to variation in ground water elevation, material supplies and contractor availability. While quantification of the effect of these variables has been attempted in this study, every effort should be made by those interested in sewer construction costs to estimate the results of these parameters in a specific project's bidding environment.

In some cases insufficient data were available to develop cost relationships for specific pipe diameters, appurtenances or non-construction costs. As more construction cost history becomes available, the existing data base can be expanded and regularly updated providing a more complete series of cost estimating relationships.

3.0 INTRODUCTION

3.1 Background

The United States Environmental Protection Agency and its predecessor agencies have provided financial aid to local municipalities for wastewater treatment and collection facility construction since 1957. In the twenty one years of these grants programs several thousand municipal facilities have been constructed, enlarged, or upgraded. Under the authority of the Water Pollution Control Act Amendments of 1972 (Public Law 92-500), this effort intensified as the EPA set out to achieve the goals of that act, including:

1. "That the discharge of pollutants into the navigable water be eliminated by 1985."
2. "That wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water be achieved by July 1, 1983."

Under PL 92-500, collector sewers became grant eligible for the first time and EPA grant assistance increased from 50 to 75 percent for interceptor sewer projects. More importantly, funds allocated to water pollution abatement increased substantially under the act as shown in the following table:

PL 92-500 OBLIGATIONS
(Federal Share)

Fiscal Year Ending	Dollars Obligated
6/30/73	$ 1,591,000,000
6/30/74	1,384,000,000
6/30/75	3,616,000,000
9/30/76	4,809,000,000
9/30/77	6,669,000,000
Total to 9/30/77	$ 18,069,000,000

In total, 18 billion dollars have been obligated to date in funding over 11,000 treatment plant and sewer facilities under PL 92-500. Surprisingly, over 50 percent of these funds were designated for construction of sewer facilities. The increase in level of effort evidenced by this allocation is tremendous when compared to the 6.1 billion dollars funded between 1961 and 1972 under previous programs. Recently, the 1977 amendments to the Clean Water Act authorized 4.5 billion dollars per year in Federal funds to be appropriated for the construction of water pollution control facilities for each of the next four years. Based on the 1976 Needs Survey, approximately 35 billion dollars, or 36 percent of the total Category I through V needs, are for eligible collector and interceptor facilities. These facts indicate that construction of wastewater conveyance systems will continue to be an area of intense financial concern for many years.

3.2 Study Objectives

The increased intensity and volume of construction work underway since the passage of PL 92-500 has combined with general inflationary economic trends to cause a sharp rise in wastewater conveyance facility construction costs. Tracking these price trends is difficult since many factors which are difficult to predict, like material and labor cost, affect the final cost of any facility. However, in order to control and project expenditures, the EPA must have access to accurate cost estimating techniques and objective criteria for future allocations of pollution control money.

This study, using data on the cost of constructing wastewater conveyance systems in the recent past, attempts to establish an empirical base from which future costs can be estimated. The assumption is made that past costs can be adjusted for inflation, material and labor cost fluctuations and various other influences to yield an estimate of what similar facilities will cost in the future. These estimating procedures are intended to be simple and accurate enough to be applied to EPA's future cost estimating needs, including:

1. Step I (Facilities Planning) Cost Effective Analysis Requirements.
2. Step II (Plans and Specifications) Design Cost Guidelines.
3. Biennial Needs Survey Cost Estimating, as required by PL 92-500.
4. 208 Areawide Planning, Cost Effective Analysis.

3.3 Additional Benefits

While EPA's cost estimating needs provide the main impetus for this study, there are other important benefits in related fields, including those outlined below. An attempt has been made to direct this document to each of these audiences to the extent possible.

3.3.1 Input to CAPDET Model

Concurrent with this study, the EPA and the U.S. Army Corps of Engineers launched a joint effort to refine the Corps' existing CAPDET Model (Computer Assisted Procedure for the Design and Evaluation of Wastewater Treatment Systems). Along with estimating the cost of treatment plants, CAPDET will allow estimation of construction costs for wastewater conveyance systems. It is anticipated that the present study will provide unit costs for sewer pipe and appurtenances as input to TRANS, in addition to non-construction costs essential for complete estimates.

3.3.2 State Pollution Control Construction Programs

Many states operate construction grant programs which are an integral part of the Federal program and growing just as rapidly. The construction cost tabulations presented in this study could help personnel in these programs estimate future costs.

3.3.3 Planning Agencies at Local and Regional Levels

At the initial stage of project planning, cost of previous construction in a usable format would provide a beneficial tool, if not the only tool, for cost estimates by local and regional planners.

3.3.4 Citizen Participation

A section of the data presented in this study is intended to provide interested citizens with a simple method of estimating the cost and potential tax burden of proposed sewer systems. Section 7.0 presents simplified cost estimating procedures with examples of their use for those interested in general sewer system construction costs. It should be noted that guidelines for determining eligibility for collector sewer grant assistance are set forth under Title II of the Clean Water Act and are clarified in subsequent program requirements memoranda. These regulations are important in estimating potential tax burden for a specific community. Section 6.7 presents a general analysis of selected sewer projects including per capita costs and required sewer lengths.

3.4 Future Applications

Cost estimates based on previous construction bid data cannot, of course, replace engineers' estimates for wastewater conveyance system projects. However, the history of construction cost must be a major consideration in economic planning efforts. As this data base is developed and refined based on accumulation of cost experience, it should become complementary to and supportive of other cost estimating techniques. Also, as a benchmarking tool it should serve to illuminate significant disparities in cost estimates for sewer system and lead to rationalization of these differences.

3.5 Data Base Updates

It is the EPA's intention to update cost data on a regular basis subsequent to this initial study, thus creating a "construction cost history" for wastewater conveyance systems. EPA funding of new municipal projects should yield a quantity and quality of bid data sufficient for this purpose.

4.0 SCOPE OF STUDY

4.1 Public Law 92-500 Facilities

This study was limited to projects either completely or partially funded under PL 92-500. Generally, collector sewer systems are eligible for grant assistance if they serve a community in existence on October 18, 1972 and are proven cost-effective. Interceptor sewer facilities are eligible if determined cost-effective based on facility planning information. In most cases bid data for grant ineligible sewer facilities are included with the tabulation of eligible facilities in the EPA grant files. Cost data for both eligible and ineligible facilities were gathered and analyzed in this study.

All projects sampled in this study were bid after second quarter 1973 and as a result allow three advantages. First, recent construction costs minimize the effects of changing construction practices and regulatory revisions on resultant cost relationships. Second, the accuracy of indexing costs to a current base dollar increases with more recent data. Third, the effect of the law itself on construction costs is effectively discounted.

A list of facilities from which bid data was collected is presented by region and by state in Appendix B. Map B.1 depicts the location of the sewer construction projects sampled in this study.

4.2 Sample Selection

Because of the large number of grants issued under PL 92-500 and the tremendous amount of resultant cost information, coupled with limited EPA resources, it was not feasible to review all recently constructed facilities nationwide.

In a parallel study analyzing costs of treatment plant construction (MCD-37), a statistical analysis was performed to determine the size, type and location of plants necessary for a valid sample. This analysis was based on the Grants Information Control System (GICS) file and resulted in a data base of 536 treatment plants. For the purposes of this study, it was assumed that a valid sample of conveyance system costs would result by gathering data for sewer facilities constructed in conjunction with treatment plants. There were 285 sewer systems sampled in this category. In addition, 170 sampled sewer facilities were constructed independent of treatment plant projects. Emphasis was placed on obtaining a representative sampling from each EPA region and state with projects from both Standard Metropolitan Statistical Areas (SMSA) and non-SMSA's covering a wide range of pipe sizes and construction conditions.

4.3 Non-Construction Cost Data

The normal procedure for allotment of water pollution control funds under PL 92-500 to eligible communities encompasses three "steps." The

Step I phase includes facility planning, general cost-effective analysis and preliminary sewer design. Step II funds provide for preparation of detailed plans and specifications for the chosen alternative, while Step III monies are allotted for actual construction.

This study provided for the collection of non-construction cost data including the non-construction portion of Step III costs such as administrative, fiscal, legal, engineering and land acquisition. Step I and Step II grant costs and other significant items were also accumulated. Non-construction costs are presented in this report separately and as part of total per foot costs for in-place sewerage facilities.

5.0 DATA COLLECTION AND ANALYSIS

5.1 Preliminary Survey

Prior to extensive collection of facility cost information, a preliminary survey of available construction bid data was performed. This survey investigated municipal and state construction files as well as those in EPA regional offices. It was found that EPA grant files provided the most consistent and detailed cost information and, therefore, were the exclusive source of construction bid information for this study.

5.2 Data Collection Worksheet

After reviewing the preliminary survey, data collection worksheets were developed and collection efforts begun in each of the ten EPA regional offices. Data collection worksheets were designed to facilitate keypunching and recall of cost information for computer analysis. They also provided for collecting itemized costs for non-construction items such as legal fees, administrative expense, project inspection, Step I, and Step II costs. In addition, physical parameters such as land use, soil conditions and topography were coded. Appendix A provides a detailed description of the data forms with definitions of the coded items.

5.3 The Data Base

Construction cost data were taken from winning contractor bid tabulations only. Consideration was given to gathering and averaging bid costs from the two or three low bidders. While this method may have dampened the effect of certain bid irregularities, available time and manpower resources precluded the use of this approach.

The data base for the cost tables and relationships developed in this study is comprised of over 13,000 bid items for both construction and non-construction costs. Construction costs include unit costs for gravity sewers and force mains, broken down into labor and material components when available. Information for sewer pipe is classified by diameter, pipe type and depth; lengths, unit costs and total costs are included for each bid item. Data for pumping stations, both package and custom built, were collected, including pumping capacity and total dynamic head. Costs for appurtenances and other non-pipe costs associated with gravity and pressure sewers were coded and analyzed in Section 6.0 of this report. These appurtenances and non-pipe costs include:

- Manholes - Standard and Drop
- Thoroughfare crossings
- Pavement Removal and Replacement
- Utility Removal and Reconnections
- Rock Excavation
- Special Pipe Bedding
- Miscellaneous Appurtenances

Non-construction costs collected and analyzed included:

- Administrative/Legal
- Preliminary

- Land, Structures, Right-of-Way
- Architect/Engineer Basic Fees
- Other Architect/Engineer Fees
- Project Inspection
- Land Development
- Relocation Expense
- Relocation Payments to Individuals and Businesses
- Demolition and Removal
- Bond Interest
- Contingency
- Indirect Costs
- Miscellaneous
- Equipment
- Other Eligible Costs

Mobilization costs were often bid separately and thus were itemized as separate appurtenance costs, while dewatering, trench shoring and normal pipe bedding were included in the cost for in-place sewer pipe. Pipe jacking and casing costs were incorporated in the appurtenance category of which they were a part such as a particular stream or thoroughfare crossing.

5.4 Cost Indexing

Costs were updated from their bid date to third quarter 1977 dollars using the EPA Complete Urban Sewer System (CUSS) cost Index. Thus, all cost relationships presented in Section 6 are third quarter 1977 dollars. Appendix C describes the procedure employed to bring all reported construction costs to a common dollar base.

5.5 Data Analysis

Initial computer screening of the bid data was performed to ensure quality of the data base. Unrealistically high or low bid prices were eliminated in this process. An example of deleted items would be bids such as one cent per foot of eight inch clay pipe or one cent per cubic yard of rock excavation. Such bid peculiarities result from contractor's surpluses of a particular item or contractor's speculation on the anticipated quantities of specific bid items and are not representative of realistic marketplace construction values.

Conveyance system construction costs have been developed on the basis of dollars per foot of pipe in-place. Section 6.0 presents total in-place construction costs by diameter, pipe type and depth. Appendix D presents unit costs for various pipe types, depths and diameters by EPA Region. To obtain total in-place costs, the cost of appurtenances and non-construction items had to be allocated to individual pipe costs. The following procedure was used to accomplish this:

1. Appurtenance costs were summed for the entire project.

2. Non-construction costs including Step I, Step II and Step III non-construction items were totalled for the project.
3. The total volume of sewer pipe was calculated using the diameter and length of each pipe bid item.
4. For each bid item the ratio of volume for that specific item to the total volume of the job was calculated.
5. To the unit cost for each pipe item was added the portion of appurtenance and non-construction cost resulting from multiplying (4) by (1) and (2), respectively.

The breakdown of total per-foot pipe costs into pipe cost, appurtenance cost and non-construction costs is shown in Section 6.0 also.

A significant percentage of the total expense of a wastewater conveyance project results from non-construction cost items. These non-construction costs were readily available during the course of data collection from the EPA grant files. In addition to being included in total pipe costs, non-construction costs have been analyzed separately. Tables 6.4 and 6.5 summarize the average ratios of Step I, Step II and Step III non-construction costs to total construction costs for facilities sampled in this study. Note that national average ratios for a particular non-construction cost item may be lower than the regional figures since some projects had no expenditures for certain items. While there were 455 sewer projects sampled, only non-construction costs from those built independent of plants were included in this table. For plant and sewer projects covered under the same grant, non-construction costs were lumped together and unidentifiable for either plant or sewer portions only.

In addition to Step III non-construction costs the percentage of construction costs for Step I and Step II grants have also been analyzed. Based only on projects which have proceeded through individual Step I, II and III phases, the percentages indicated at the bottom of Table 6.4 were calculated. Step I and II percentages were then added to the Step III non-construction cost percentages to yield total project non-construction cost percenages for new wastewater conveyance systems as indicated on the bottom of Table 6.5.

6.0 RESULTS OF DATA ANALYSIS

The following wastewater conveyance system cost relationships have been developed from a data base of 455 sanitary sewer construction projects. The types and details of data collected for each facility allow a multitude of cost relationships and other correlations to be produced. Those presented in this chapter were thought to be the most relevant and usable to the cost estimating user community.

A survey of the tables and figures will indicate that, while some categories of cost data are founded on a significant number of bid items, others are weakly supported and must be used with caution or, possibly, not at all. The number of data points used to calculate average costs for each item is shown in parentheses beside the unit cost. In some cases tables or costs were included which contain relatively little actual data. This was done for two reasons: first, to emphasize the uncertainty of data presented and, second, to provide criteria and format for future additions to this data base by the EPA as more construction history becomes available. Obviously, construction practices, needs and conditions in certain areas may preclude widespread use of certain sizes or types of sewer pipe; thus, the lack of data for various items in tables such as Table 6.1 will inherently reflect the construction practices of the various EPA regions.

The cost relationships are compiled in tabular form (rather than as families of curves) to allow side-by-side presentation of average unit costs and the number of points (N) upon which it is based. Tables 6.1 and 6.2 are summaries of Appendix D tables in which costs are tabulated by EPA region to facilitate cost estimation for construction cost comparison purposes. Also in Appendix D, unit costs per foot of pipe are broken into categories for pipe, appurtenances and non-construction costs. Due to the variation in parameters such as depth and pipe type from table to table, the user should check to ensure use of the correct cost category when using Chapter 6 or Appendix D information.

6.1 GRAVITY SANITARY SEWER: IN-PLACE COSTS

The unit cost of pipe including materials and labor (i.e. in-place) is added to appurtenance cost on a per foot basis and non-construction cost on a per foot basis to yield total, in-place gravity sewer cost by diameter as shown in Table 6.1. Section 5.3 describes the appurtenance and non-construction cost items which are included in the per foot cost of gravity pipe in this section. Costs are presented in Table 6.1 for various types and depths of pipe as well as for construction in and out of Standard Metropolitan Statistical Areas (SMSAs).

Table 6.2 is a tabulation of in-place, gravity sewer costs for each pipe type at various ranges of depth. This table allows comparison of the cost of specific pipe types and indicates the relative increase in cost due to increasing pipe depths. While increasing depth and diameter of sewer pipe should be reflected by increasing cost per foot, this is not shown in some specific cases in Tables 6.1 and 6.2. Reasons for these inconsistencies were difficult to determine and in many cases could not be resolved. Scarcity of data for a particular classification may cause unusually high costs for a few bid items such as trench shoring or dewatering to have disproportionately greater effect on national average costs. For instance, the cost of 6 inch diameter vitrified clay pipe at depths greater than 15 feet from Table 6.2 is the average of only three bid items. Likewise the average per foot costs for 27 and 30 inch VC pipe in the same depth range seem inconsistent. While detailed analysis of the design plans and specifications for the projects represented in these averages would probably explain this inconsistency, this level of analysis was not possible in this study. Obviously, use of such costs for estimating purposes should be avoided.

The data presented in Tables 6.1 and 6.2 are a summary of the tables presented in Appendix D which provide breakdowns of unit costs by EPA Region and by material, appurtenance and non-construction costs.

6.2 NON-PIPE AND APPURTENANCE COSTS

A significant portion of final, in-place construction cost for sanitary sewer facilities results from non-pipe expenses for items listed on Table 6.3 The total percentage (111%) indicates that non-pipe and appurtenance expenses are actually more costly than the materials and labor for pipe installation. Percentages developed for this table are

Table 6.1

SANITARY SEWERS

AVERAGE TOTAL COST PER FOOT OF PIPE
(includes all appurtenances and all non-construction costs)

	PIPE TYPE							DEPTH					
Diameter	PVC	Asbestos Cement	Vitrified Clay	Cast Iron	Reinforced Concrete	Ductile Iron	Other	< 8 Feet	8-15 Feet	> 15 Feet	SMSA	Non-SMSA	National Average
04	14.53 (17)	9.07 (5)	15.21 (14)	8.64 (5)	14.85 (4)	---	10.76 (2)	12.37 (1)	13.15 (7)	---	13.50 (49)	11.08 (68)	12.09 (117)
06	15.59 (25)	22.00 (11)	23.24 (104)	30.08 (12)	17.14 (4)	27.62 (15)	17.93 (9)	16.38 (7)	24.24 (48)	33.73 (6)	28.43 (150)	19.23 (182)	23.38 (332)
08	54.51 (91)	34.85 (203)	30.82 (519)	35.51 (49)	20.59 (11)	49.63 (86)	25.05 (60)	21.76 (133)	30.85 (637)	44.31 (277)	39.35 (542)	30.99 (899)	32.75 (1436)
10	36.16 (64)	42.57 (162)	37.81 (292)	44.23 (34)	23.30 (9)	46.47 (50)	37.36 (50)	27.09 (75)	36.90 (407)	51.35 (173)	39.02 (364)	41.88 (524)	40.30 (887)
12	61.20 (42)	54.54 (133)	48.29 (301)	56.16 (44)	51.14 (30)	66.89 (44)	41.76 (47)	37.28 (59)	45.40 (344)	61.35 (173)	53.47 (394)	47.33 (432)	49.19 (825)
15	40.15 (17)	76.72 (63)	57.37 (128)	149.90 (4)	74.73 (78)	63.43 (3)	52.74 (33)	41.67 (33)	61.90 (198)	71.08 (85)	72.44 (239)	52.89 (199)	59.52 (436)
16	---	96.27 (24)	90.02 (14)	81.55 (9)	72.50 (9)	63.93 (32)	75.73 (4)	57.72 (9)	75.43 (42)	80.40 (21)	79.78 (52)	79.30 (49)	79.55 (101)
18	41.73 (1)	75.34 (86)	68.43 (132)	93.02 (14)	84.89 (124)	84.71 (48)	61.67 (23)	60.80 (46)	67.00 (227)	73.93 (113)	90.61 (282)	69.07 (251)	80.47 (533)
21	---	112.34 (30)	80.33 (56)	206.25 (1)	95.48 (112)	56.91 (1)	61.17 (11)	89.86 (14)	87.05 (97)	101.29 (69)	94.86 (95)	89.59 (133)	89.23 (238)
24	---	116.09 (40)	90.05 (75)	191.36 (16)	98.99 (227)	113.83 (39)	96.02 (34)	82.27 (26)	93.45 (205)	107.73 (142)	118.01 (227)	92.20 (256)	104.15 (485)
27	---	---	124.19 (18)	---	127.71 (69)	---	113.77 (11)	96.60 (4)	109.78 (39)	117.55 (44)	133.21 (77)	95.57 (54)	117.69 (131)
30	---	256.37 (2)	148.81 (20)	---	138. 8 (224)	143.47 (19)	143.66 (15)	136.54 (19)	122.27 (114)	132.31 (119)	146.18 (213)	133.11 (125)	141.35 (338)
36	---	---	160.76 (15)	---	187.01 (243)	229.86 (11)	183.57 (19)	197.96 (9)	150.61 (108)	160.08 (118)	213.57 (189)	158.21 (127)	189.19 (322)
42	---	---	117.04 (3)	---	234.60 (124)	371.79 (11)	198.11 (6)	364.40 (1)	193.62 (35)	254.25 (53)	259.18 (81)	264.15 (63)	249.01 (155)
48	---	---	159.61 (4)	---	260.40 (83)	---	314.47 (1)	176.96 (1)	190.12 (12)	292.69 (23)	283.28 (75)	231.99 (29)	268.98 (104)
54	---	---	---	---	261.56 (61)	---	367.88 (2)	---	207.12 (14)	282.19 (30)	265.97 (62)	238.25 (4)	264.29 (66)
60	---	---	---	---	364.50 (89)	---	306.61 (12)	---	323.81 (22)	319.66 (59)	390.67 (73)	356.11 (40)	378.44 (113)
66	---	---	---	---	370.05 (36)	---	---	---	287.48 (1)	377.66 (12)	366.36 (36)	436.82 (7)	377.83 (43)
72	---	---	---	---	412.02 (69)	---	---	---	369.83 (5)	423.73 (23)	422.21 (41)	436.25 (22)	411.37 (73)
78	---	---	---	---	438.52 (31)	---	915.96 (3)	---	---	---	479.42 (35)	---	479.42 (35)
84	---	---	---	---	779.78 (6)	---	---	---	---	---	618.99 (14)	---	618.99 (14)
90	---	---	---	---	537.29 (3)	---	---	---	---	---	620.27 (4)	---	620.27 (4)
96	---	---	---	---	465.56 (1)	---	---	---	---	---	730.55 (3)	---	730.55 (3)
Total	(257)	(759)	(1695)	(188)	(1647)	(359)	(342)	(437)	(2552)	(1540)	(3297)	(3464)	(6791)

Note: Numbers in parentehsis indicate the sample size

Table 6.2

SANITARY SEWERS

AVERAGE TOTAL COST PER FOOT OF PIPE
(includes all appurtenances and all non-construction costs)

	PVC			ASBESTOS CEMENT			VITRIFIED CLAY		
Diameter	< 8 Ft.	8-15 Ft.	> 15 Ft.	< 8 Ft.	8-15 Ft.	> 15 Ft.	< 8 Ft.	8-15 Ft.	> 15 Ft.
04	---	---	---	---	---	---	---	---	---
06	---	11.63 (6)	13.99 (1)	---	27.90 (4)	---	15.94 (4)	25.23 (21)	46.26 (3)
08	25.14 (7)	51.40 (44)	70.02 (22)	23.61 (26)	28.05 (101)	37.66 (48)	21.46 (47)	29.51 (247)	38.99 (109)
10	25.91 (5)	39.36 (32)	38.12 (16)	28.40 (15)	33.86 (84)	51.42 (46)	23.40 (23)	37.48 (151)	47.69 (50)
12	19.32 (2)	35.16 (20)	48.17 (8)	39.06 (13)	44.13 (75)	72.53 (34)	38.01 (18)	46.33 (143)	57.71 (67)
15	27.75 (2)	38.69 (11)	60.05 (1)	48.22 (7)	52.54 (31)	81.25 (23)	51.24 (12)	58.40 (64)	82.81 (18)
16	---	---	---	---	72.15 (14)	81.21 (6)	70.02 (1)	89.80 (8)	94.39 (5)
18	---	---	---	61.91 (10)	76.24 (51)	78.87 (25)	62.63 (12)	73.39 (71)	101.80 (21)
21	---	---	---	105.44 (3)	108.07 (16)	123.01 (10)	46.91 (3)	72.82 (19)	107.43 (17)
24	---	---	---	162.27 (1)	97.23 (26)	150.26 (13)	74.69 (4)	87.19 (36)	101.44 (17)
27	---	---	---	---	---	---	70.98 (1)	74.04 (4)	80.16 (6)
30	---	---	---	---	256.37 (2)	---	---	71.51 (2)	78.46 (4)
36	---	---	---	---	---	---	---	94.44 (1)	110.26 (9)
42	---	---	---	---	---	---	---	---	---
48	---	---	---	---	---	---	---	---	---
54	---	---	---	---	---	---	---	---	---
60	---	---	---	---	---	---	---	---	---
66	---	---	---	---	---	---	---	---	---
72	---	---	---	---	---	---	---	---	---
Total	(16)	(113)	(48)	(75)	(404)	(205)	(125)	(767)	(325)

Note: Numbers in parentheses indicate the sample size.

Table 6.2 (continued)

SANITARY SEWERS

AVERAGE TOTAL COST PER FOOT OF PIPE
(includes all appurtenances and all non-construction costs)

	CAST IRON			REINFORCED CONCRETE			DUCTILE IRON			OTHER		
Diameter	< 8 Ft.	8-15 Ft.	> 15 Ft.	< 8 Ft.	8-15 Ft.	> 15 Ft.	< 8 Ft.	8-15 Ft.	> 15 Ft.	< 8 Ft.	8-15 Ft.	> 15 Ft.
04	---	---	---	12.37 (1)	15.68 (3)	---	---	---	---	---	---	---
06	22.39 (1)	17.98 (2)	---	14.66 (1)	17.97 (3)	---	---	38.16 (1)	---	---	19.45 (2)	---
08	24.11 (4)	32.40 (17)	47.65 (1)	16.68 (1)	19.99 (3)	---	31.76 (9)	46.04 (25)	93.73 (8)	16.86 (6)	23.00 (28)	28.20 (12)
10	27.08 (4)	39.01 (11)	60.59 (2)	79.53 (2)	24.95 (3)	30.22 (1)	25.76 (5)	56.90 (17)	74.79 (3)	25.28 (3)	29.79 (24)	40.72 (11)
12	45.03 (2)	48.18 (14)	61.94 (3)	---	34.20 (5)	36.20 (2)	42.47 (4)	69.32 (7)	82.76 (10)	26.44 (2)	31.88 (13)	52.88 (17)
15	---	---	---	82.82 (5)	57.03 (29)	55.53 (24)	---	55.88 (1)	---	65.35 (1)	54.01 (9)	63.38 (8)
16	43.39 (1)	109.17 (5)	---	49.09 (1)	70.31 (2)	67.08 (5)	55.41 (4)	61.28 (11)	78.78 (5)	---	---	---
18	---	77.14 (5)	141.10 (1)	124.20 (7)	69.28 (47)	69.32 (34)	49.37 (4)	91.51 (12)	89.48 (18)	108.00 (1)	59.32 (7)	60.87 (5)
21	---	---	---	123.46 (6)	89.96 (49)	94.69 (41)	---	---	---	---	57.90 (4)	50.26 (1)
24	104.45 (2)	118.33 (5)	---	53.11 (8)	88.18 (94)	96.73 (84)	81.08 (3)	108.19 (15)	150.40 (13)	85.63 (1)	82.29 (9)	86.67 (11)
27	---	---	---	119.43 (2)	130.90 (20)	128.15 (30)	---	---	---	---	105.08 (2)	120.33 (5)
30	---	---	---	108.58 (8)	110.42 (80)	134.43 (94)	138.19 (2)	155.10 (9)	122.37 (5)	---	101.69 (4)	---
36	---	---	---	202.32 (6)	147.40 (88)	163.70 (96)	268.16 (1)	274.32 (4)	282.02 (1)	---	157.03 (6)	171.74 (8)
42	---	---	---	---	168.79 (28)	245.46 (46)	364.40 (1)	371.71 (4)	389.81 (4)	---	187.94 (3)	208.28 (3)
48	---	---	---	176.86 (1)	190.12 (12)	292.69 (23)	---	---	---	---	---	---
54	---	---	---	---	207.12 (14)	279.86 (29)	---	---	---	---	---	349.90 (1)
60	---	---	---	---	327.81 (19)	321.53 (50)	---	---	---	---	298.51 (3)	309.31 (9)
66	---	---	---	---	287.48 (1)	377.66 (12)	---	---	---	---	---	---
72	---	---	---	---	369.83 (5)	423.73 (23)	---	---	---	---	---	---
Total	(14)	(59)	(7)	(49)	(505)	(594)	(33)	(106)	(67)	(14)	(114)	(91)

TABLE 6.3

AVERAGE NON-PIPE COSTS AS PERCENT OF TOTAL IN-PLACE PIPE COST

Category	Percent of Pipe Cost
Sanitary Sewer Miscellaneous Appurtenances	8
Manholes	36
Manholes, Drop Type	2
Thoroughfare Crossings	15
Stream Crossings	1
Rock Excavation	2
Pavement Removal & Replacement	14
Special Bedding	1
Miscellaneous Costs not Categorized	31
Utility Reconnection & Removal	01
Total:	111

Other categories of non-pipe costs were less than one percent of pipe cost and were not included in this table.

national averages for all types, diameters and depths of pipe and can be expected to vary widely for specific construction conditions. Fewer manholes in rural areas, need for extensive rock excavation and greater numbers of road crossings in urban areas are typical factors which would affect percentages for given projects.

6.3 NON-CONSTRUCTION COSTS

Another significant expense associated with gravity sewer construction are costs for Step I, Step II and Step III non-construction items. Step I costs under PL 92-500 provide for facility planning and economic comparison of treatment and conveyance alternatives. Step II funds pay for detailed design and specification development for the cost-effective alternative selected at the Step I phase. Based on the project data collected for this study, average Step I and Step II costs are presented in Table 6.4 as a percentage of the total construction cost. Projects included in this table must have had both Step I and Step II costs. Projects without separate Step I and II costs often had these costs included in other categories, thus making such projects inappropriate for future cost comparison. Only a relatively few recent projects have progressed through all three steps, thus explaining the scarcity of data employed in Table 6.4.

Additional non-construction costs are incurred as part of the Step III construction phase. Table 6.5 lists the non-construction items and the percentage of each of total construction cost. There were no

TABLE 6.4

AVERAGE STEP I COST/TOTAL CONSTRUCTION COST*
AVERAGE STEP II COST/TOTAL CONSTRUCTION COST

REGION	AVE STEP I/TCC	# WITH STEP I	AVE STEP II/TCC	# WITH STEP II
01	---	0	---	0
02	---	0	.0843	1
03	---	0	.0445	1
04	.1474	1	.0310	1
05	.0252	12	.0679	4
06	.0479	2	.0612	3
07	---	0	.0512	3
08	.0499	3	.1696	4
09	---	0	.2088	1
10	---	0	---	0
	.0386 - Weighted Average	18	.0920	18

*Developed from data for new sanitary sewer facilities with both Step I and Step II grants for sewer construction only.

TABLE 6.5

NON-CONSTRUCTION COST/TOTAL CONSTRUCTION COST (NCC/TCC)

FOR SANITARY SEWER FACILITIES

Non-Construction Item Description	Region 1	Region 2	Region 3	Region 4	Region 5	Region 6	Region 7	Region 8	Region 9	Region 10	National Average	Sample Size
Administrative/Legal	.0060	.0227	.0213	.0172	.0022	.0067	.0288	.0099	.0098	.0136	.0113	137
Preliminary	--	--	--	--	--	--	--	--	.0006	.0188	.0007	7
Land, Structures, Right-of-Way	.0081	--	.0073	.0158	.0019	.0048	.0084	--	--	.0017	.0030	24
Architect/Engineer Basic Fees	--	.0051	.1298	.0263	.0608	.0128	.0217	.0180	.0815	--	.0368	14
Other Architect/ Engineer Fees	--	--	--	--	.0240	.0037	.0044	.0209	--	--	.0113	6
Project Inspection	--	.0386	.0121	.0145	.0003	.0254	.0531	.0412	.0070	.0528	.0147	47
Relocation Payments to Individuals and Businesses	--	--	--	--	--	.0134	--	--	--	--	.0006	2
Bond Interest	--	--	.0025	.0017	--	--	--	--	--	--	.0006	5
Contingency	.0308	.0685	.0503	.0589	.0266	.0625	.0447	.0629	.0604	.0421	.0450	151
Indirect Costs	--	--	--	--	.0025	--	--	--	--	--	.0009	6
Miscellaneous	--	.0017	.0015	.0069	.0025	--	--	.0045	--	.0211	.0031	12
Equipment	--	.0001	.0008	--	--	--	--	--	--	.0030	.0003	7
Other Eligible Costs	--	--	.0018	.0014	.0003	--	--	--	.0321	.0052	.0041	13

Average Total Step III NCC: .1324
Average Step I: .0386
Average Step II: .0920

Average Total Project NCC: .2630

Note: None of the projects sampled required expenses for Land Development, Relocation Expenses or Demolition and Removal expenses incurred for land development, relocation expenses (to municipal authorities) and demolition and removal for the projects sampled in this study. Average Step I and Step II costs are added to the total national average Step III non-construction cost on Table 6.5 to show average total non-construction cost.

6.4 FORCE MAIN COSTS

Table 6.6 is a tabulation of average per foot construction costs for pressurized sanitary sewer. Unlike Tables 6.1 and 6.2, costs on Table 6.6 do not include allowances for appurtenances or non-construction costs. Unit prices are for force main in-place, including materials and labor costs for pipe only. This variation is necessitated by the wide variety of construction conditions under which force main is built, ranging from inexpensive construction in areas with little elevation difference to expensive stream or thoroughfare crossings. Such variation would tend to obscure the relative difference in pipe construction costs.

Care should be exercised in using this table since a comparatively small percentage of the total footage of sanitary sewer construction is force main and, as a result, average costs in Table 6.6 are based on relatively few data points.

6.5 PUMPING STATION COSTS

Construction bid costs were collected for over 500 sanitary sewer pumping stations ranging in capacity from 0.1 MGD to over 100 MGD and

Table 6.6

FORCE MAIN SANITARY SEWERS
AVERAGE COST PER FOOT OF PIPE IN-PLACE

DIAM	REG 01	REG 02	REG 03	REG 04	REG 05	REG 06	REG 07	REG 08	REG 09	REG 10	NATIONAL
01	$ 10.86 N= 1	$ .00 N= 0	$ 3.47 N= 6	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 4.52 N= 7
02	$ .00 N= 0	$ .00 N= 0	$ 2.96 N= 10	$ 1.27 N= 2	$ 6.38 N= 8	$ 2.62 N= 2	$ .00 N= 0	$ .00 N= 0	$ 1.96 N= 2	$ .00 N= 0	$ 3.85 N= 24
03	$ .00 N= 0	$ .00 N= 0	$ 2.95 N= 2	$ .00 N= 0	$ 8.82 N= 5	$ .00 N= 0	$ .00 N= 0	$ 4.03 N= 1	$ 5.87 N= 1	$ .00 N= 0	$ 6.66 N= 9
04	$ 12.24 N= 5	$ 12.19 N= 7	$ 8.88 N= 31	$ 3.87 N= 8	$ 9.08 N= 45	$ 4.76 N= 12	$ 7.52 N= 3	$ 3.55 N= 6	$ 14.09 N= 5	$ 10.39 N= 5	$ 8.54 N= 127
06	$ 15.54 N= 9	$ 16.24 N= 8	$ 14.15 N= 30	$ 5.39 N= 12	$ 10.53 N= 57	$ 7.20 N= 15	$ 10.79 N= 3	$ .00 N= 0	$ 9.76 N= 4	$ 13.06 N= 5	$ 11.22 N= 143
08	$ 19.94 N= 4	$ 12.64 N= 3	$ 13.08 N= 31	$ 6.67 N= 12	$ 14.47 N= 30	$ 13.58 N= 15	$ .00 N= 0	$ 7.88 N= 1	$ 20.62 N= 6	$ 12.72 N= 3	$ 13.43 N= 105
10	$ 18.18 N= 6	$ 18.53 N= 3	$ 16.80 N= 8	$ 8.62 N= 5	$ 17.13 N= 11	$ 13.59 N= 8	$ 18.75 N= 1	$ .00 N= 0	$ 17.47 N= 1	$ 29.64 N= 7	$ 17.66 .N= 50
12	$ 19.83 N= 3	$ 59.91 N= 6	$ 28.82 N= 6	$ 22.58 N= 1	$ 24.62 N= 15	$ 14.74 N= 2	$ .00 N= 0	$ .00 N= 0	$ 27.80 N= 1	$ .00 N= 0	$ 30.62 N= 34
14	$ 31.27 N= 1	$ 25.72 N= 4	$ 26.48 N= 3	$ 30.29 N= 1	$ 23.77 N= 5	$ 28.02 N= 3	$ .00 N= 0	$ 33.96 N= 1	$ 34.99 N= 3	$ .00 N= 0	$ 27.89 N= 21
16	$ .00 N= 0	$ 33.79 N= 5	$ 24.37 N= 4	$ 25.85 N= 3	$ 28.31 N= 10	$ 17.52 N= 2	$ 21.64 N= 1	$ .00 N= 0	$ 31.08 N= 2	$ .00 N= 0	$ 27.63 N= 27
18	$ 57.94 N= 1	$ 29.11 N= 4	$ 26.77 N= 1	$ .00 N= 0	$ 27.11 N= 4	$ 21.00 N= 1	$ .00 N= 0	$ .00 N= 0	$ 38.66 N= 3	$ .00 N= 0	$ 31.90 N= 14
20	$ .00 N= 0	$ 45.02 N= 8	$ 37.82 N= 1	$ .00 N= 0	$ 34.30 N= 10	$ 22.45 N= 3	$ .00 N= 0	$ .00 N= 0	$ 62.38 N= 4	$ .00 N= 0	$ 40.69 N= 26
21	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 53.68 N= 1	$ .00 N= 0	$ 53.68 N= 1
24	$ 157.10 N= 2	$ 62.30 N= 11	$ 29.88 N= 2	$ 44.18 N= 2	$ 45.67 N= 10	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 75.33 N= 2	$ .00 N= 0	$ 60.51 N= 29
30	$ .00 N= 0	$ 129.86 N= 6	$ 51.57 N= 4	$ 63.84 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 92.76 N= 12
36	$ .00 N= 0	$ [illegible] N= 10	$ .00 N= 0	$ [illegible] N= 1	$ 64.10 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 99.48 N= 1	$ .00 N= 0	$ 109.51 N= 13

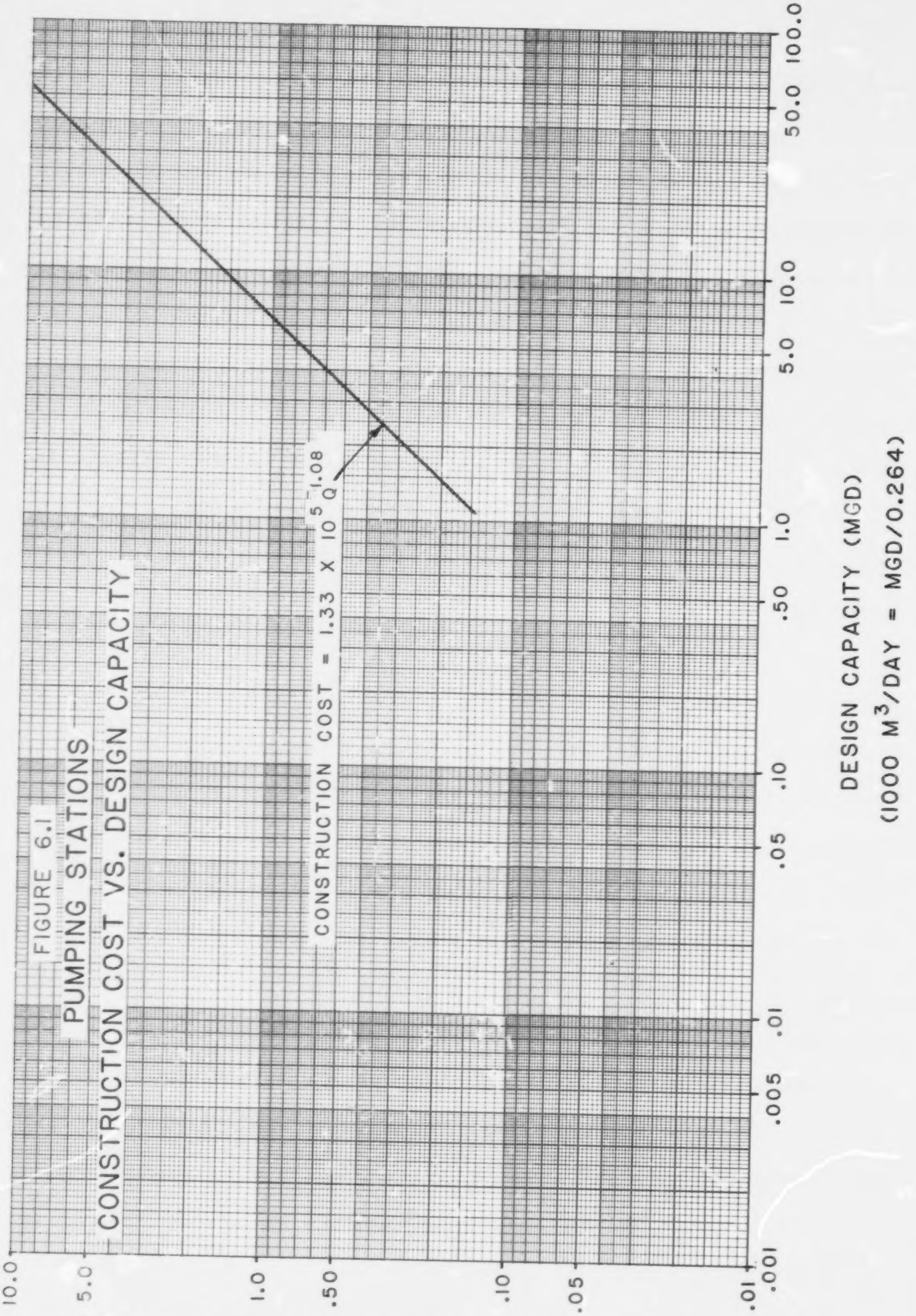

FIGURE 6.1
PUMPING STATIONS
CONSTRUCTION COST VS. DESIGN CAPACITY

with pumping heads from 10 feet to over 100 feet. Figure 6.1 is a plot of construction cost versus design capacity for all values of pumping head. These curves and corresponding equations are the result of linear regression curve fit analysis and are statistically valid to the 95 percent confidence interval. While statistically valid, the data base for pump stations is not detailed or consistent enough to define usable curves for various heads. As a result, the average pumping station cost curve is utilized in Chapter 7.0 cost estimating techniques. Since cost estimating tables included in this report are directed primarily at planning level estimates where a level of detail providing pump station heads is usually not available, Figure 6.1 should prove useful.

6.6 MATERIAL/LABOR COSTS

Often, in sanitary sewer construction bid tabulations, the material and labor components were itemized and bid separately as gravity sewer pipe and pipe installation costs, respectively. These data were tabulated for SMSA and non-SMSA projects and are summarized in Tables 6.7 and 6.8 for various depth ranges.

While conclusions based on these tables cannot be final due to the limited availability of data for some categories, interesting trends are seen at this point. First, from Table 6.7 it appears that smaller diameter pipe is somewhat less expensive for rural, non-SMSA projects than those in more urban, SMSA areas. This trend seems to be

Table 6.7

GRAVITY SEWERS

MATERIAL COMPONENT - COST PER FOOT OF PIPE

Diameter	SMSA	Non-SMSA	National Average
04	2.04 (2)	5.92 (11)	5.58 (13)
06	7.41 (8)	4.96 (30)	5.70 (38)
08	7.47 (52)	6.86 (67)	7.09 (119)
10	9.87 (27)	10.15 (32)	9.99 (59)
12	10.42 (40)	13.09 (29)	11.54 (69)
14	24.79 (1)	17.85 (6)	17.89 (7)
15	22.97 (43)	10.62 (15)	19.71 (58)
16	33.01 (11)	17.80 (7)	25.72 (18)
18	18.24 (47)	13.40 (25)	15.64 (72)
20	32.76 (6)	27.68 (4)	30.05 (10)
21	27.32 (26)	18.15 (6)	24.23 (32)
24	23.43 (37)	34.77 (11)	27.44 (48)
27	29.18 (8)	35.28 (8)	31.15 (16)
30	36.45 (18)	61.00 (10)	44.57 (28)
33	41.08 (2)	52.65 (3)	46.45 (5)
36	38.53 (31)	51.69 (13)	43.92 (44)
42	50.09 (8)	98.03 (5)	60.80 (13)
48	75.69 (15)	206.44 (1)	81.46 (16)
54	104.42 (12)	---	104.42 (12)
60	67.52 (20)	---	67.52 (20)
66	99.33 (19)	---	99.33 (19)
72	209.15 (17)	---	209.15 (7)
84	127.24 (1)	---	127.24 (1)
Total	(451)	(283)	(734)

Note: Numbers in parentheses indicate the sample size.

Table 6.8

GRAVITY SEWERS

LABOR COMPONENT - COST PER FOOT OF PIPE BY DEPTH

	SMSA			NON-SMSA			NATIONAL AVERAGE		
Diameter	<8 Ft.	8-15 Ft.	>15 Ft.	<8 Ft.	8-15 Ft.	>15 Ft.	<8 Ft.	8-15 Ft.	>15 Ft.
04	--	9.87 (8)	--	--	--	--	--	9.87 (8)	--
06	--	11.12 (2)	--	--	--	--	--	11.12 (2)	--
08	7.14 (6)	11.26 (42)	21.50 (4)	15.52 (9)	4.97 (36)	5.87 (18)	11.10 (15)	6.38 (78)	8.41 (22)
10	8.24 (3)	12.71 (15)	34.72 (1)	--	10.26 (14)	23.71 (4)	8.24 (3)	12.27 (29)	31.90 (5)
12	11.23 (5)	19.69 (29)	51.28 (7)	2.32 (1)	8.96 (13)	21.33 (8)	10.12 (6)	15.21 (42)	30.99 (15)
15	8.54 (2)	27.91 (32)	56.31 (15)	--	4.06 (4)	5.10 (2)	8.54 (2)	25.25 (36)	35.36 (17)
18	6.14 (2)	28.11 (44)	36.46 (25)	--	7.39 (9)	4.30 (9)	6.14 (2)	26.11 (53)	29.58 (34)
20	7.12 (1)	11.38 (4)	25.84 (6)	--	--	--	7.12 (1)	11.38 (4)	25.84 (6)
21	12.14 (1)	25.20 (5)	20.56 (5)	--	3.35 (4)	5.81 (5)	12.14 (1)	12.39 (9)	11.23 (10)
24	16.07 (2)	26.37 (29)	41.47 (24)	--	--	4.98 (4)	16.07 (2)	26.37 (29)	34.73 (28)
27	11.08 (1)	25.80 (20)	50.66 (23)	2.16 (1)	4.10 (4)	5.96 (2)	5.57 (2)	17.45 (24)	48.88 (25)
30	8.61 (1)	18.02 (6)	31.57 (7)	--	3.73 (7)	6.97 (10)	8.61 (1)	8.87 (13)	13.01 (17)
33	11.06 (1)	12.74 (6)	15.83 (12)	--	--	--	11.06 (1)	12.74 (6)	15.83 (12)
36	18.74 (1)	30.31 (23)	47.28 (26)	17.36 (2)	22.55 (12)	15.02 (23)	17.94 (3)	27.93 (35)	31.28 (49)
42	--	59.23 (3)	103.65 (1)	--	--	9.95 (6)	43.77 (1)	59.23 (3)	11.29 (7)
48	--	59.23	126.65 (21)	--	--	--	--	59.23 (2)	126.65 (21)
54	--	78.23 (7)	81.85 (22)	--	--	--	--	78.23 (7)	81.85 (22)
60	26.78 (1)	31.12 (2)	52.10 (5)	--	--	--	26.78 (1)	31.12 (2)	52.10 (5)
66	26.77 (1)	29.46 (2)	86.93 (13)	--	--	--	26.77 (1)	29.46 (2)	86.93 (13)
72	--	--	142.70 (10)	--	--	--	--	--	142.70 (10)
Total	(28)	(281)	(227)	(13)	(103)	(91)	(42)	(384)	(318)

Note: Numbers in parentheses indicate the sample size reversed above 21 inch diameter, with non-SMSA pipe costs consistently exceeding those of SMSA projects. A second trend, evident in Table 6.8, indicates the higher cost of labor for all depths of sewer in SMSA areas compared to non-SMSA areas. Although this could be expected and explained by the complexity of construction in urban areas and higher wage rates due to unionization, the relative differences indicated by these data are nevertheless interesting. Again, such inferences are not conclusive and must be reevaluated as more construction history becomes available.

6.7 Typical Small Community Per Capita Lengths and Costs

Using sanitary sewer information from this study, Table 6.9 was produced to illustrate the variation in per capita lengths and costs for construction projects in small communities. Projects were selected only if the collector and interceptor system was designed for the entire population of the town. In rural communities, waste flows from residents on the outskirts of town may not be cost-effective to collect and treat, although the cost burden is shared with those considered part of the design population. For such cases, actual per capita costs may vary from those shown to the degree that design population varies from the population sharing the cost burden.

Since bid information was collected from EPA Step III grant files without reference to project plans or specifications, the classification of sewer pipe as collector or interceptor was not possible. As a result,

TABLE 6.9

TYPICAL SMALL COMMUNITY PER CAPITA LENGTHS AND COSTS

Community	Population	Collector Length Per Capita (ft/cap)	Interceptor Length Per Capita (ft/cap)	Bid Date	Per Capita① Cost ($/cap)	25%③ Community Share ($/cap)
A	4000	18.6	6.5	6/28/78	229	57
B	1500	27.2	18.1	2/12/76	753	188
C	1865	21.6	7.4	12/11/73	650	163
D	5000	25.3	5.0	12/31/73	656	164
E	4500	10.5	7.1	6/16/75	814	204
F	4500	10.9	1.1	6/01/76	176	44
G	6400	20.0	3.1	6/30/76	1195	299
H	3950	11.3	1.7	5/28/76	541	135
I	3900	12.2	2.2	10/16/75	618	155
J	513	68.6	②	4/19/75	594	149

Notes:

① Costs per capita are for the date of the construction bid and include Step I, Step II and Step III non-construction costs.

② Collector and interceptor sewers are all 8" diameter and therefore indistinguishable for this study.

③ Community share per capita assumes 75% EPA Grant and no state assistance.

per capita lengths for collector and interceptor shown in Table 6.9 were developed assuming collector to be pipe less than or equal to 8 inch diameter and interceptor all pipe greater than 8 inch diameter. Admittedly, this assumption was arbitrary and did not consider the design function of the sewer pipe. While total length per capita (collector and interceptor) could be obtained by combining both per capita lengths from Table 6.9, individual breakdowns as shown must be considered rough estimates.

7.0 SIMPLIFIED CONVEYANCE SYSTEM COST ESTIMATING TECHNIQUES

7.1 BACKGROUND

The Environmental Protection Agency, in accordance with Sections 516 (b) (2) and 205(a) of the Federal Water Pollution Control Act Amendments of 1972 (PL 92-500), must submit a report to Congress before February, 10, 1979 entitled "1978 Cost Estimates for the Construction of Publicly-Owned Wastewater Treatement Facilties." Commonly referred to as the "Needs Survey," similar reports have been submitted to Congress in 1974, 1975 and 1977. The major objective of the 1978 Needs Survey is to provide a comprehensive estimate of the total cost of meeting the water pollution control goals of the Act. Included in this report will be cost estimates on a facility by facility basis for Category IVA and IVB needs, collector and interceptor systems respectively.

In the process of developing cost estimates for new sewer facilities, the most accurate cost information available is to be employed. A majority of the facilities reviewed will have cost information available based on completed Step I facilities planning or other similar engineering criteria. However, in many cases specific plans and cost estimates will not have been developed.

One of the objectives of the present study was to provide construction cost estimating criteria to be used in the 1978 Needs Survey for facilities in this latter case. In developing cost estimates for these conveyance systems based on previous bid data, three criteria were considered important:

1. The resultant cost curves and procedures had to be broad in scope and applicable to a wide range of construction conditions.
2. Cost estimating methods had to be flexible enough to be applied coast to coast yet technically consistent providing national uniformity.
3. Methods were to be straightforward, facilitating utilization by a variety of users.

The following cost estimating procedures include curves and tables described below and are presented in the belief that the lay public often has need to estimate treatment plant construction costs.

7.2 SANITARY SEWER COST ESTIMATING PROCEDURES

Table 7.1 - Sanitary Sewer Costs

Table 7.1 was produced using the data base outlined in Section 6.0 of this report; it lists per foot costs for a range of diameters of gravity sewers. Costs presented in this table have been updated to first quarter 1978 dollars using the EPA CUSS Index. The 1978 Needs Survey cost table includes allowances in the per foot pipe costs for Step I and Step II as well as Step III non-construction costs such as administrative, legal, inspection and contingency expenses. In addition, these costs include allowances for typical quantities of appurtenances such as manholes, pavement removal and replacement, and special bedding.

Table 7.2 - Sizing of Collector Sewers

Those using Needs Survey Procedures for cost estimates probably will have minimal background information available. Collected populations and rough lengths of sewer required will often be the only available data. In such cases, Table 7.2 may be employed to estimate the pipe diameter needed. The design discharge (collected) flow may be estimated by multiplying the population served by an average per capita flow, say 100 gallons per person per day. Industrial flow, if known, may be added also.

The pipe diameter from Table 7.2 will be used to enter Table 7.1. While actual constructed systems would consist of a range of sizes and include pipe smaller than the diameter indicated by Table 7.2, this size will be used for all pipe due to the lack of detailed data.

Figure 7.1 - Pump Station Costs

This curve provides total construction costs for pump stations as a function of average design capacity. No definition by head pumped is provided since information on such would normally not be available at this level of planning. Likewise, the number and size of pump stations is not likely to be known. In such instances, data from neighboring community systems may provide usable information. In cases where no information is available, Needs Survey procedures allow one pump station (sized to handle the maximum flow for the calculated pipe diameter from Table 7.2) for each 18,000 total feet of collector and interceptor sewer.

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This is an extremely rough estimate based on nationally averaged constructed facilities and should be used only as a last resort.

Table 7.3 - Sanitary Sewer Construction Multipliers

The in-place, per-foot pipe costs listed in Table 7.1 are national average costs and should be adjusted to reflect the relative construction history of the given community. Table 7.3 lists area multipliers to be applied to collector, interceptor and pump station costs. These were computed from costs based on firm engineering estimates and costs of comparable construction for over 500 data points as reported in the 1976 Needs Survey.

Map 7.1 - Sanitary Sewer Area Multiplier Map

Map 7.1 has been developed to define areas of influence of the cities listed in Table 7.3. County or State boundaries were followed in all cases. For the many areas not close to a reference city, labor rate histories were correlated using the system described in Appendix C to define boundary locations.

Table 7.4 - Sanitary Sewer Cultural Modifiers

The cost of sanitary sewer construction changes considerably with variation in site conditions. Costs in congested urban areas with many underground utilities, heavy traffic loading and higher unionization rates are generally much higher than costs in open country or rural communities.

Using data from the 455 sewer facilities analyzed in Section 6.0 factors defining such construction cost variation were developed. Multipliers listed in Table 7.4 are to be used for sewer and pump station construction costs based on anticipated construction conditions.

To produce cost estimates for planned sanitary sewer facilities using the tables and curves the following information is required:

1. Population and per capita sewage flows. From this information design flow may be estimated. More specific information, such as pipe diameters or lengths, domestic and industrial sewage flows is desirable but often not available.
2. Geographical construction setting e.g. open country, residential streets, etc.
3. Total lengths of collector and interceptor sewer required.

It was assumed that specific design information such as pipe depth and pipe type (vitrified clay, asbestos cement, etc.) would not be known in the planning stage at which these cost estimating procedures are utilized. Usually, such specific data are not available until preliminary or even final design is completed; in such instances engineers' cost estimates would replace these procedures.

Likewise, the number, size and total head of required pumping stations rarely would be known and estimates for pumping stations parameters must be produced by other methods including:

1. Data on number and size of pumping stations for geographically similar collector and/or interceptor facilities in neighboring communities.
2. Rough estimates based on initial survey of the community to be served by the planned system.

Note that if number one above yields usable pumping station data it may also provide more accurate length and cost data for sewer pipe estimating. If no data on number and size of pump stations are available, the rule-of-thumb of one pump station per 18,000 feet of sewer may be used.

Since estimates of sewer length may be unavailable, rough rules-of-thumb of 16 feet of collector sewer per person and one foot of interceptor sewer per foot of collector were developed from previous construction data. Again, these are rules-of-thumb to be used only in the absence of more reliable information.

7.3 SANITARY SEWER FACILITY COST ESTIMATE-EXAMPLE

The following is an example cost estimate developed using the tables and curves just described. The limited amount of input data required dictates that the resultant cost estimate be used for preliminary planning only.

Requirement:

Collector and interceptor sewers are required for an eligible residential population of 1,600 in Glendive, Montana. Flows from sewered areas of the town indicate an average sewage flow of 90 gallons per person, including an allowance for infiltration and inflow. Also, the town limits the smallest size of collector sewer to 8 inches in diameter. No information is available on required lengths of sewer, sizes or number of pump stations.

Solution:

Collector Sewer Costs:

1. Allowing 16 feet per person for collector sewer length:
   Total Collector Length = 16 x 1,600 = 25,600 feet
   Design Flow = 1,600 x 90 gpcd = 0.14 mgd
2. From Table 7.1:
   For 8-inch Diameter Sewer Pipe at $43.00
   per foot x 25,600 feet $ 1,101,000
3. From Table 7.3:
   Seattle Area Multiplier x 1.0735
   $ 1,182,000
4. From Table 7.4:
   Suburban Residential Modifier x 0.91
5. Collector Sewer Cost Estimate: $ 1,075,000

Interceptor Sewer Costs:

1. Allowing one foot of interceptor length for each 16 feet of collector length:

   Total Interceptor Length - 25,600/16 = 1,600 feet

2. Flow for 1,600 people at 90 gallons per capita per day:

   Total Flow = 90 x 1,600 = 144,000 gpd

3. From Table 7.2 for 0.144 mgd:

   Size of Interceptor = 8-inch diameter

4. From Table 7.1:

   Cost of 8-inch Sewer in-place at $43.00
   per foot x 1,600 feet $ 69,000

   $ 69,000

5. From Table 7.3:

   Seattle Area Multiplier x 1.0735

   $ 74,000

6. From Table 7.4:

   Suburban Residential Modifier x 0.91

7. Interceptor Sewer Cost Estimate: $ 67,000

Pumping Station Costs:

1. Allowing one pump station per 18,000 feet of collector and interceptor sewer:

   Collector + Interceptor Length = 25,600 + 1,600 = 27,200 feet.

   27,200/18,000 = 1.51<2

   Therefore, one pumping station is justified.

2.	From Figure 7.1:	
	Cost for one 0.170 mgd pumping station	$ 25,000
3.	From Table 7.3:	
	Seattle [illegible]ea Multiplier	x 1.0735
		$ 26,838
4.	From Table 7.4:	
	Surburban Residential Multiplier	x 0.91
5.	Pumping Station Cost Estimate:	$ 24,422
	Total Facility Cost	$ 1,166,000

This estimate includes allowances for Step I, Step II and Step III non-construction costs as well as costs for all associated appurtenances. Also, as the tables and figures are based on First Quarter 1978 dollars so the estimated cost is indexed to that quarter.

TABLE 7.1

SANITARY SEWER COSTS
TOTAL IN-PLACE COSTS PER LINEAL FOOT*
(January 1978 Dollars)

Pipe Diameter (inches)	Average Cost ($/foot)
6	24
8	43
10	47
12	59
15	73
18	94
21	118
24	124
27	136
30	178
36	215
42	250
48	302
54	337
60	418
66	445
72	483

* Includes associated appurtenances and non-construction costs.

TABLE 7.2

SIZING OF COLLECTOR AND INTERCEPTOR SEWERS

Design Discharge Range (mgd)	Pipe Diameter (inches)
0.08 or less	6
0.08 - 0.17	8
0.17 - 0.29	10
0.29 - 0.47	12
0.47 - 0.82	15
0.82 - 1.3	18
1.3 - 1.9	21
1.9 - 2.7	24
2.7 - 3.8	27
3.8 - 4.9	30
4.9 - 8.0	36
8.0 - 11.8	42
11.8 - 17.0	48
17.0 - 22.5	54
22.5 - 29.5	60
29.5 - 37.5	66
37.5 - 48.0	72

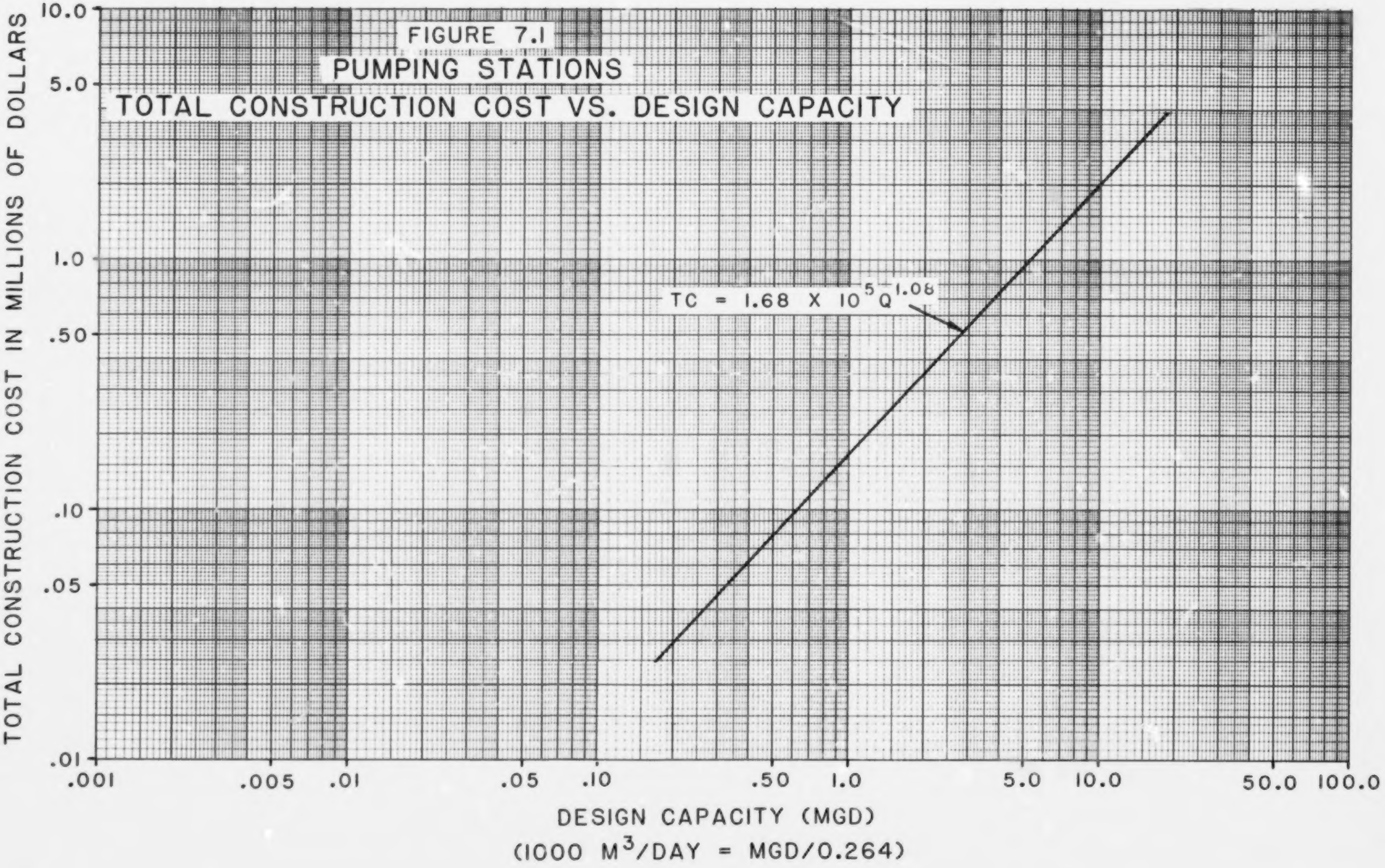

FIGURE 7.1

PUMPING STATIONS

TOTAL CONSTRUCTION COST VS. DESIGN CAPACITY

NOTE: TOTAL COST INCLUDES STEP I, II, AND III NON-CONSTRUCTION COSTS

TABLE 7.3

SANITARY SEWER CONSTRUCTION AREA MULTIPLIERS

REFERENCE: MAP 7.1

Area Code	Area	Multiplier
101	Atlanta, Georgia	0.8088
102	Baltimore, Maryland	1.0147
103	Birmingha, Alabama	0.7059
104	Boston, Massachusetts	1.1176
105	Charlotte, North Carolina	0.5952
106	Chicago, Illinois	1.1324
107	Cincinnati, Ohio	1.0515
108	Cleveland, Ohio	1.1324
109	Dallas, Texas	0.7132
110	Denver, Colorado	0.8088
111	Detroit, Michigan	1.1103
112	Houston, Texas	0.7868
113	Kansas City, Missouri	0.9926
114	Los Angeles, California	1.1691
115	Miami, Florida	0.8529
116	Milwaukee, Wisconsin	1.0000
117	Minneapolis, Minnesota	0.9559
118	New Orleans, Louisiana	0.9853
119	New York, New York	1.2647
120	Philadelphia, Pennsylvania	1.1912
121	Pittsburgh, Pennsylvania	1.0809
122	St. Louis, Missouri	1.2132
123	San Francisco, California	1.1103
124	Seattle, Washington	1.0735
125	Trenton, New Jersey	1.0809

STATE AND TERRITORIAL MULTIPLERS

Alaska	2.6667
Guam	1.2465
Hawaii	1.2833
Puerto Rico	0.6290
Trust Territories	0.9037

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E.P.A. MUNICIPAL CONSTRUCTION COST INDEX MAP

SANITARY SEWER FACILITIES · CITY MULTIPLIERS

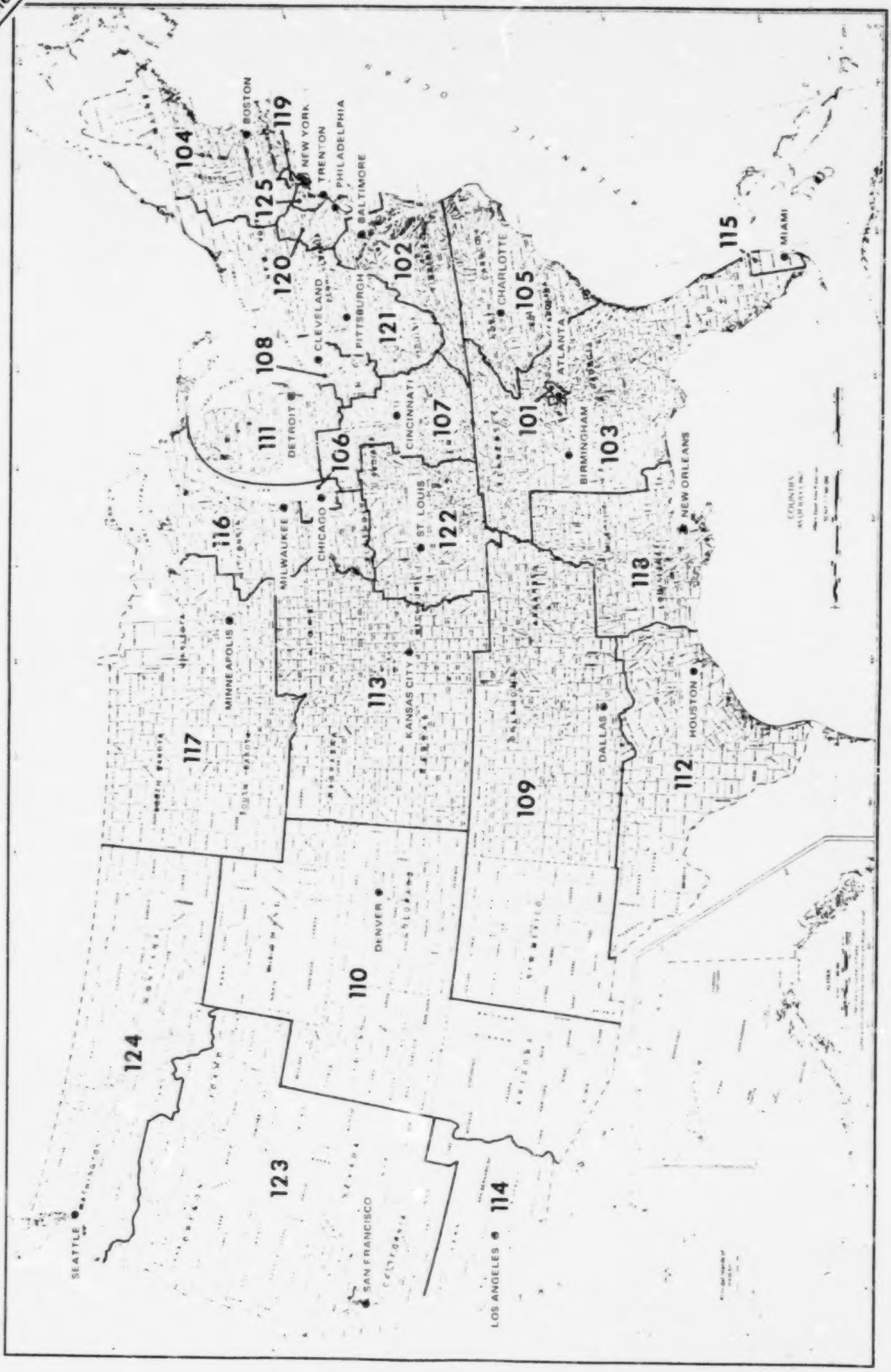
104
BOSTON
119
NEW YORK
TRENTON
PHILADELPHIA
125
BALTIMORE
120
102
CLEVELAND
PITTSBURGH
121
108
CHARLOTTE
105
115
MIAMI
ATLANTA
101
111
DETROIT
106
CINCINNATI
107
BIRMINGHAM
103
NEW ORLEANS
116
MILWAUKEE
CHICAGO
ST LOUIS
122
113
MINNEAPOLIS
KANSAS CITY
113
HOUSTON
DALLAS
117
109
112
110
DENVER
124
123
SAN FRANCISCO
SEATTLE
LOS ANGELES
114
MAP 7.1

TABLE 7.4

SANITARY SEWER CULTURAL MODIFIERS

Cultural Definition	Multiplier
Open Country	0.67
Suburban Residential	0.91
Dense Residential (within City limits)	1.08
Commercial/Industrial	1.20

APPENDIX A

METHODOLOGY

A.1 General

Based on a preliminary survey of potential sources of construction bid data for wastewater conveyance systems, it was determined that the EPA municipal construction grant files, located in the ten regional offices, provided the most consistent and detailed cost information. A more in-depth study of these files furnished information used to organize the data collection effort and develop the data worksheet shown as Figure A.1.

Basically, this worksheet is arranged to allow tabulation of general facility information, total construction and non-construction costs (first-order data) and costs for individual pipe and appurtenance items (third-order data). A separate worksheet was completed for each facility sampled. The completed worksheets were sent to a central location for quality assurance and keypunching into the data base.

A.2 Worksheet Definitions

The following is a block by block description of the data fields provided on the wastewater conveyance system worksheet, Figure A.1. To facilitate data collection, many fields utilize coded items as shown on Table A.1. This table should be used in conjunction with Figure A.1 and the following field descriptions:

(1) Grant No. - This six-digit number indicates the particular grant under which EPA funds are allotted for sanitary sewer facilities. A grant may apply to both sewer and treatment needs; however, only conveyance system costs were collected on this worksheet.

(2) Facility Name - This is the commonly accepted title of the wastewater conveyance system being constructed. Facilities named as treatment plants may include sewer facilities and thus be included in this study.

(3) City or Town - Indicated here is the name of the city in which the facility is located.

(4) State - Shown is the state in which the facility is located.

(5) County - This is the county in which the facility is located.

(6) Region - Coded here is the number of the EPA Region in which the facility is located.

(7) A/F Number - The Authority/Facility Number is a nine-digit number indicating the state, in the first two digits, authority, in the next four digits, and the facility within that authority in the last three digits. This number uniquely identifies the particular facility and can be used to identify the facility's discharge permit number,if any, and grant number through the EPA's cross reference index.

(8) Type Facility - This block refers to the type of construction provided for in the grant number specified. Treatment facilities only, collection facilities only, or a combination of both may be coded, as indicated on the code reference table included as Table A.1.

(9) Change - Table A.1 lists the possible change codes each specifying the nature of the sewer system construction.

(10) Topography - This field employs the codes listed in Table A.1 and classifies the type of terrain on which construction was performed.

(11) Soil Type - As listed in Table A.1, this field employs a two digit code. The first digit categorizes the groundwater level with respect to foundation construction. The second digit specifies the soil type at the construction site.

(12) Use - This field utilizes a two-digit code to specify both the land use designation applicable to the construction site and the surface geography of the site.

(13) Extra Conditions - Extraordinary site conditions which significantly affected construction are coded numerically in this field and explained under the same code in the "comments" section of the worksheet.

(14) Population - Based on the breakdown listed in Table A.1, the population of the community served by the conveyance facility is coded in this block. This population is not necessarily the service population of the constructed system.

(15) Distance - Coded in this field is the distance, in tens of miles, from the area served by the new system to the closest city of 50,000 population or more.

(15a) Zip Code - This field provides the zip code of the city or town specified in Block 3.

(16) Total Project Cost - Input here is the total eligible project cost as determined from the EPA Step III grant file for the facility. The EPA share will generally be 75 percent of this number. If code 03 is used in Block 8, the cost in Block 16 will include the cost for the associated wastewater treatment plant.

(17) Date - This is the contract date as specified in the Step III, construction contract documents for the project cost shown in Block 16.

(18) Step I Cost - Input in this field is the total grant eligible cost for the Step I planning phase. If the project included a treatment plant in addition to sewer facilities, the Step I cost indicated will include facilities planning costs for both.

(19) Date - This field provides the grant award date for the Step I planning cost.

(20) Step II Cost - Input here is the total grant eligible cost for the Step II design phase. Again, if the project included treatment facilities in addition to sewer works, the cost for design of both would be included in Block 20.

(21) Date - This block indicates the grant award date for the Step II phase.

(22) Construction Cost - This field specifies the actual construction cost obtained from the project contract documents. This cost includes total, eligible capital construction expenses and does not include Step I or Step II costs or Step III non-construction costs. For projects covering both collection and treatment facilities, only the construction bid cost for the conveyance system is indicated in Block 28.

(23 a-h) Non-Construction Cost - These eight blocks are allocated for Step III non-construction cost items as enumerated in Table A.1, Items 24a-h. Blocks 24a-h correspond to the same lettered cost, i.e. Block 24c is the appropriate code for the cost tabulated in Block 23c. The non-construction item costs were obtained directly from the EPA grant files.

(23i) Architect/Engineer - The name of the engineering firm responsible for the design and construction inspection of the conveyance facility was coded in this space.

(23j) Contractor - The name of the construction company to which the conveyance system contract was awarded was coded in this space.

(24 a-h) Non-construction Cost Code - These blocks correspond to the non-construction item blocks (Block 23) with the same letter code. The codes utilized for specifying non-construction item costs are listed in Table A.1.

(25) Cost Category - Each of the three digits in this block define an element of individual construction items.

1st Digit - As Listed on Table A.1 this defines the category of the cost item.

2nd Digit - This specifies whether the cost is for materials only, labor only or in-place cost including labor and materials.

3rd Digit - When other than a "zero" this digit indicates that the given cost is for a specific sewer appurtenance as indicated on Table A.1.

This list of appurtenances was developed after extensive pre-survey analysis of sewer bid data. The items listed are those most commonly defined in bid tabulations nationwide.

Examples of the use of Item 25 would be:

Code 130 for sanitary sewer, in-place;

Code 132 for sanitary sewer, in-place pipe bedding material;

Code 410 for manhole materials only; and

Code 236 for pavement removal and replacement for force main sewers.

(26) Diameter - Input in this block is the inside diameter in inches for gravity sewer pipe, force main, and manhole cost items. This space is left blank for pumping station cost items.

(27) Length/Capacity - The block contains one of the following descriptive items.

a. For gravity or force main sewer items the length associated with the cost in Block 29 for the specific bid item is shown in this field.

b. For pump station cost items the design capacity of each station is listed in this block.

c. For manhole cost items the number of manholes to which the total cost in Block 29 applies is listed in this space.

(28) Unit Cost - For gravity sewer, force main and manhole cost items, the cost per unit is given in this block. For gravity sewer and force main items this would indicate dollars per foot of length. For manholes the cost per unit is entered here. Cost for manhole extension rings are coded separately as manhole appurtenance costs. For pumping stations this block is left blank.

(29) Total Cost - Indicated here are the extended costs for gravity sewer, force main and manhole cost items e.g. Block 27 x Block 28. Since pumping stations are itemized separately, the cost for each station is tabulated in this field.

(30) Depth/TDH - The depth, when specified in bid tabulations, for gravity sewer cost items is entered in this block. When available, the total dynamic pumping head (TDH) for pumping station items is entered here.

(31) Pipe/Type - As indicated on Table A.1 the type of pipe on which the cost of Block 28 is based is entered in this column with the following codes:

01-PVC (Polyvinylchloride pipe)
02-AC (Asbestos cement pipe)

03-VC (Vitriied clay pipe)

04-CI (Cast iron pipe)

05-RCP (Reinforced concrete pipe)

06-DIP (Ductile iron pipe)

07-Other

For pumping station items the type of station planned (i.e. either custom or package) is identified according to Table A.1 codes.

(32) Special Condition - When extraordinary conditions existed which affected the costs presented in Blocks 28 and 29, a numeric code was employed in this field. The specific conditions where then enumerated in the "Comments" section of the form under the same code number.

FIGURE A.1

DATA COLLECTOR ____________________

DATE OF COLLECTION ____________________

DATA LOCATION ____________________

SANITARY SEWERS
FORCE MAINS
PUMP STATIONS

GENERAL

(1) GRANT NO. (2) FACILITY NAME (3) CITY OR TOWN (4) STATE (5) COUNTY

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81

1 1

(6) EPA REGION (7) A/F NUMBER (8) TYPE FAC (9) CHANGE (10) TOPO (11) SOIL (12) USE (13) X-COND (14) POP (15) DIST (15a) ZIP

1 2

(16) TOTAL PROJECT COST (17) DATE (18) STEP 1 COST (19) DATE (20) STEP 2 COST (21) DATE

1 3

1ST ORDER

(22) CONSTRUCTION COST (23a) NON-CONS. ITEM (24a) CODE (23b) NON-CONS. ITEM (24b) CODE (23c) NON-CONS. ITEM (24c) CODE (23d) NON-CONS. ITEM (24d) CODE (23e) NON-CONS. ITEM (24e) CODE

L P

(23f) NON-CONS. ITEM (24f) CODE (23g) NON-CONS. ITEM (24g) CODE (23h) NON-CONS. ITEM (24h) CODE (23i) A/E (23j) CONT

2ND & 3RD ORDER

(25) COST CAT (26) DIA (27) LENGTH/ CAPACITY (28) UNIT COST (29) TOTAL COST (30) DEPT/ TDH (31) PIPE/ TYPE (32) SPEC COND (25) COST CAT (26) DIA (27) LENGTH/ CAPACITY (28) UNIT COST (29) TOTAL COST (30) DEPT TDH (31) PIPE/ TYPE (32) SPEC COND

COMMENT SECTION

COMMENTS

TABLE A.1

CODE REFERENCE TABLE

SEWERS, FORCE MAINS, AND PUMP STATIONS

ITEM 8 - NATURE OF PROJECT

01 - Treatment Plant
02 - Collection System
03 - Both 01 and 02

ITEM 9 - NATURE OF CHANGE

01 - Enlarge
02 - Upgrade
03 - Enlarge and Upgrade
04 - New Construction
05 - Replace
06 - Abandon
07 - No Change
08 - Modification
09 - Other

ITEM 10 - TOPOGRAPHY

01 - Flat
02 - Rolling
03 - Hilly
04 - Steep

ITEM 11 - SOIL TYPE

1st Digit

00 - No Ground Water Problem
01 - Soft Fines
02 - Medium Fines
03 - Stiff Fines
04 - Coarse
05 - Rock

2nd Digit

10 - Excavate into Ground Water
20 - Surface Saturated
30 - Ground Water Unknown

ITEM 12 - LAND USE

1st Digit

10 - Agricultural
20 - Residential
30 - Dense Residential
40 - Commercial
50 - Dense Commercial
60 - Industrial
70 - Dense Industrial
80 - Municipal

2nd Digit

01 - Open/Vacant
02 - Forested/Brushy
03 - Structures
04 - Existing Thoroughfare

ITEM 14 - POPULATION

01 - Less than 2,500
02 - 2,500-5,000
03 - 5,000-10,000
04 - 10,000-25,000
05 - 25,000-50,000
06 - 50,000-100,000
07 - 100,000-250,000
08 - 250,000-500,000
09 - 500,000-1,000,000
10 - Greater than 1,000,000

ITEM 24 a-h - NONCONSTRUCTION ITEMS

01 - Administrative/Legal
02 - Preliminary
03 - Land, Structures, Right-of-way
04 - Architect/Engineer Basic Fees
05 - Other Architect/Engineer Fees
06 - Project Inspection Fees
07 - Land Development
08 - Relocation Expenses
09 - Relocation Payments to Individuals and Businesses
10 - Demolition and Removal
11 - Bond Interest
12 - Contingency
13 - Indirect Costs
14 - Miscellaneous
15 - Other Significant Ineligible Costs
16 - Equipment
17 - Other Eligible Costs (Comment)

ITEM 25 - CONSTRUCTION COST CATEGORY

1st Digit

100 - Sanitary Sewers (L.F.)
200 - Force Main (L.F.)
300 - Pumping Stations (L.S.)
400 - Manholes (Each)
500 - Drop Manholes

2nd Digit

010 - Materials
020 - Labor
030 - In Place

3rd Digit

001 - Mobilization
002 - Appurtenances
003 - Thoroughfare Crossing (L.F.)
004 - Stream Crossing (L.F.)
005 - Rock Excavation (Yd^3)
006 - Pavement Removing and Replacement L.F.)
007 - Utility Reconnection and Removal (L.F.)
008 - Bedding (Yd^3)
009 - Miscellaneous

ITEM 31 - TYPE OF PIPE & PUMP STATIONS

Type of Pipe

01 - Polyvinylchloride
02 - Asbestos Cement
03 - Vitrified Clay
04 - Cast Iron
05 - Reinforced Concrete
06 - Ductile Iron
07 - Other

Pump Stations

10 - Custom
20 - Package
30 - Other

APPENDIX B

DESCRIPTION OF DATA BASE

Data for this study were collected from 455 Federally funded facilities spread over the ten EPA regions. Name, grant number, and other information for each sample facility are listed in Table B.1. The index city refers to the Complete Urban Sanitary Sewer (CUSS) reference city to which each facility was related for cost indexing purposes. See Appendix C for a complete discussion of cost indexing procedures. Map B.1 shows the locations of sampled projects on the national map.

Table B.2 is a breakdown of the data base by pipe type, pipe depth, and diameter by state and by EPA region.

TABLE B.1

LISTING OF SEWERS SAMPLE
IN REGION AND GRANT NUMBER ORDER

GRANT NO.	FACILITY NAME	CITY	STATE	COUNTY	INDEX CITY
090155	STONINGTON COLLECTION	STONINGTON	CONNECTICUTT	NEW LONDON	104
090131	PLYMOUTH SEWERS	PLYMOUTH	CONNECTICUTT	LITCHFIELD	104
230102	FORT FAIRFIELD INTERCETOR	FORT FAIRFIELD	MAINE	AROOSTOOK	104
230114	OLD ORCHARD BEACH INT	OLD ORCHARD BCH	MAINE	YORK	104
230117	SOUTH PORTLAND INTERCEPTO	SOUTH PORTLAND	MAINE	CUMBERLAND	104
230122	PORTLAND WD INTERCEPTORS	PORTLAND	MAINE	CUMBERLAND	104
250255	ROCKPORT INTERCEPTOR	ROCKPORT	MASSACHUSETTS	ESSEX	104
250266	BRADFORD INTERCEPTOR	HAVERHILL	MASSACHUSETTS	ESSEX	104
250270	ORANGE INTERCEPTOR	ORANGE	MASSACHUSETTS	FRANKLIN	104
250300	HULL WWTP & SEWERS	HULL	MASSACHUSETTS	PLYMOUTH	104
330093	MANCHESTER INTERCEPTOR	MANCHESTER	NEW HAMPSHIRE	HILLSBOROUGH	104
330104	ALLENSTOWN SEWERS	ALLENSTOWN	NEW HAMPSHIRE	MERRIMACK	104
330119	WARNER VILL.F.D. SEWERS	WARNER	NEW HAMPSHIRE	MERRIMACK	104
330137	LISBON SEWER SYSTEM	LISBON	NEW HAMPSHIRE	GRAFTON	104
440074	BLOCK ISLAND SEWER SYSTEM	NEW SHOREHAM	RHODE ISLAND	WASHINGTON	104
440086	SMITHFIELD COLLECTION	SMITHFIELD	RHODE ISLAND	PROVIDENCE	104
500079	BRANDON INTERCEPTOR	BRANDON	VERMONT	RUTLAND	104
500081	HARTFORD INTERCEPTOR	HARTFORD	VERMONT	WINDSOR	104
500083	NORTH BRANCH I.D. SEWERS	WEST DOVER	VERMONT	WINDHAM	104
500089	ENOSBURG FALLS COLLECTION	ENOSBURG FALLS	VERMONT	FRANKLIN	104
340334	EDISON TOWNSHIP INT SEWER	EDISON	NEW JERSEY	MIDDLESEX	125
340344	ATLANTIC COUNTY S.A.	ATLANTIC CITY	NEW JERSEY	ATLANTIC	120
340354	PEQUANNOCK, LINCOLN PARKE	FAIRFIELD	NEW JERSEY	ESSEX	125
340356	OCEAN CO.SEWERAGE AUTH(NJ)	TOMS RIVER	NEW JERSEY	OCEAN	125
340358	PEMBERTON M W A	NEW LISBON	NEW JERSEY	BURLINGTON	125
340377	S MONMOUTH R.S.A.	SPRING LAKE	NEW JERSEY	MONMOUTH	125
340441	HOPEWELL SANITARY SEWERS	HOPEWELL	NEW JERSEY	MERCER	125

TABLE B.1 (Continued)

340444	PENNINGTON SEWERS	PENNINGTON	NEW JERSEY	MERCER	125
340455	FIELDSBORO SEWERS	FIELDSBORO	NEW JERSEY	BURLINGTON	125
340471	MOUNTAIN LAKES	MOUNTAIN LAKES	NEW JERSEY	MORRIS	125
340479	POINT PLEASANT	POINT PLEASANT	NEW JERSEY	OCEAN	125
340499	LONG BEACH COLLECTOR SEW	BEACH HAVEN	NEW JERSEY	OCEAN	125
340507	MANTOLOKING SEWERS	MANTOLOKING	NEW JERSEY	OCEAN	125
340534	RANDOLPH TWP M.U.A.	RANDOLPH	NEW JERSEY	MORRIS	125
360389	RENSSELAER COUNTY S.D.	TROY	NEW YORK	RENSSELAER	104
360391	TONAWANDA	TONAWANDA	NEW YORK	ERIE	121
360433	SAG HARBOR SEWERAGE SYST.	SAG HARBOR	NEW YORK	SUFFOLK	119
360485	ONTARIO TOWN SEWERAGE SYS	ONTARIO	NEW YORK	WAYNE	121
360495	N TONAWANDA WTW	N TONAWANDA	NEW YORK	NIAGARA	121
360525	WATERVLIET	WATERVLIET	NEW YORK	ALBANY	104
360534	SACKETS HARBOR STP	SACKETS HARBOR	NEW YORK	JEFFERSON	121
360611	ELLICOTTVILLE INT	ELLICOTTVILLE	NEW YORK	CATTARAUGUS	121
360618	AMHERST SEW SYS	WILLIAMSVILLE	NEW YORK	ERIE	121
360638	GUILDERLAND-NORMANS KILL	GUILDERLAND	NEW YORK	ALBANY	104
360640	WALTON SEWERS	WALTON	NEW YORK	DELAWARE	104
360644	WATERFORD SEWERAGE SYSTEM	WATERFORD	NEW YORK	SARATOGA	104
360646	COBLESKILL	COBLESKILL	NEW YORK	SCHOHARIE	104
360680	CHAUTAUQUA LAKE SD	MAYVILLE	NEW YORK	CHAUTAUQUA	121
360691	ORANGE CO, S. D. #1	GOSHEN	NEW YORK	ORANGE	104
360707	NIAGARA CO S.D.31	NITONAWANDA	NEW YORK	NIAGARA	121
360720	SCOTIA SEWER IMP	SCOTIA	NEW YORK	SCHENECTADY	104
360747	NIAGARA FALLS AWT	NIAGARA FALLS	NEW YORK	NIAGARA	121
360771	WESTFIELD SEWER IMPRUVEM	WESTFIELD	NEW YORK	CHAUTAUQUA	121
360812	SODUS POINT STP	SODUS POINT	NEW YORK	WAYNE	121
360824	ALBION AWT	ALBION	NEW YORK	ORLEANS	121
360854	DEPOSIT SEWERAGE SYSTEM	DEPOSIT	NEW YORK	BROOME	121
360859	MARATHON SEWER SYSTEM	MARATHON	NEW YORK	CORTLAND	121

TABLE B.1 (Continued)

720093	PONCE LATERALS	SANTURCE	PUERTO RICO		129
780007	CHRISTIANSTED SEWERAGE SY	ST. CROIX	VIRGIN ISLAND		130
100055	DEWEY BEACH COLLECTION	DEWEY BEACH	DELAWARE	SUSSEX	120
100076	FREDERICA WW COLLECTION	FREDERICA	DELAWARE	KENT	120
100088	SO COASTAL REGIONAL SYSTE	BETHANY BEACH	DELAWARE	SUSSEX	120
100102	TIDBURY BRANCH COLLECTION	DOVER	DELAWARE	KENT	120
100103	CAMDEN-WYOMING-ISAAC BRAN	DOVER	DELAWARE	KENT	120
240152	CALVERT CO SANITARY DIST	PRINCE FREDERIC	MARYLAND	CALVERT	102
240180	FRIENDSVILLE SEWERS	FRIENDSVILLE	MARYLAND	GARRETT	121
240224	FREEDOM DIST	WESTMINSTER	MARYLAND	CARROLL	102
240243	ACCIDENT TOWN OF	ACCIDENT	MARYLAND	GARRETT	121
240255	WILLARDS SEWERS	WILLARDS	MARYLAND	WICOMICO	102
240284	WHARF AREA INTERCEPTORS	CENTREVILLE	MARYLAND	QUEEN ANNE'S	102
240289	LAVALE SEWERS	LAVALE	MARYLAND	ALLEGANY	121
240294	BALLENGER CREEK WTW	FREDERICK	MARYLAND	FREDERICK	102
240311	FREEDOM DISTRICT INTERCEP	SYKESVILLE	MARYLAND	CARROLL	102
240312	INTERCEPTORS	BALTIMORE	MARYLAND	BALTIMORE	102
240318	CLEAR SPRING SEWERS	CLEAR SPRING	MARYLAND	WASHINGTON	102
240319	WILLIAMSPORT INTERCEPTOR	WILLIAMSPORT	MARYLAND	WASHINGTON	102
240339	BROADWATER CELLO PHASE II	BROADWATER	MARYLAND	ANNE ARUNDEL	102
240348	MARGATE COLLECTION SYSTEM	MARGATE	MARYLAND	ANNE AVONDEL	102
240374	ACCOKEEK AREA INTERCEPTOR	ACCOKEEK	MARYLAND	PRINCE GEORGES	102
240393	SMITH ISLAND COLLECTION	SMITH ISLAND	MARYLAND	SOMERSET	102
240453	BUSH CREEK FORCE MAIN	LONG BAR HARBOR	MARYLAND	HARFORD	102
340333	PARSIPPANY-TROY HILLS INT	PARSIPPANY	NEW JERSEY	MORRIS	125
420600	VALLEY FORGE SEWER AUTH.	PHOENIXVILLE	PENNSYLVANIA	CHESTER	120
420621	MALVERN MUNICIPAL AUTH	MALVERN	PA	CHESTER	120
420622	PORTAGE JOINT SEWER AUTH	PORTAGE	PENNSYLVANIA	CAMBRIA	121
420657	TRI-BORO MUNICIPAL AUTH	SUSQUEHANNA	PENN	SUSQUEHANNA	120
420701	MOSHANNON VALLEY J.S.A.	PHILIPSBURG	PENNSYLVANIA	CENTRE	121

TABLE B.1 (Continued)

420707	MC CANDLESS TWP SAN.AUTH	PITTSBURGH	PENNSYLVANIA	ALLEGHENY	121
420711	HAMILTONBAN TWP AUTH	GETTYSBURG	PENNSYLVANIA	ADAMS	102
420712	OLEY TWP MUNICIPAL AUTH.	OLEY	PENN.	BERKS	120
420723	ADAMS TOWNSHIP	DUALO	PENNSYLVANIA	CAMBRIA	121
420724	STONYCREEK(UPPER) J.M.A.	HOOVERSVILLE	PENNSYLVANIA	SOMERSET	121
420733	THOMPSONTOWN MUNIC.AUTH.	THOMPSONTOWN B.	PENNSYLVANIA	JUNIATA	121
420739	POINT MARION MUNIC AUTH	POINT MARION	PENNSYLVANIA	FAYETTE	121
420742	TREMONT MUNICIPAL AUTH	TREMONT	PENNSYLVANIA	SCHUYLKILL	120
420744	MILLCREEK TWP SEWER AUTH.	ERIE	PENNSYLVANIA	ERIE	121
420760	SYKESVILLE MUNICIPAL AUTH	SYKESVILLE	PENNSYLVANIA	JEFFERSON	121
420761	ADAMS TOWNSHIP	DUALO	PENNSYLVANIA	CAMBRIA	121
420769	FRANKLIN	FRANKLIN	PENNSYLVANIA	VENANGO	121
420774	WINDSOR TWP MUNIC.AUTH.	RED LION	PENNA	YORK	102
420775	CARMICHAELS-CUMBERLAND JT	CARMICHAELS	PENNSYLVANIA	GREENE	121
420781	SCHAYLKILL HAVEN MUNIC.A.	SCHUYLKILL HAVE	PENNSYLVANIA	SCHUYLKILL	120
420783	BROWN TWP MUNICIPAL AUTH	REEDSVILLE	PENNSYLVANIA	MIFFLIN	121
420799	MONONGAHELA MUNICIPAL AUT	MONONGAHELA	PENN	WASHINGTON	121
420800	SO.PARK TWP SEWER AUTH.	LIBRARY	PENN	ALLEGHENY	121
420820	MOUNTAINTOP AREA	MOUNTAINTOP	PENNSYLVANIA	LUZERNE	120
420837	PENN TWP SEWERAGE AUTH	HARRISON CITY	PENNSYLVANIA	WESTMORELAND	121
420883	NESHANNOCK TWP	NEW CASTLE	PENN	LAWRENCE	121
420906	UNION SEWER & DISPOSAL AU	NEW CASTLE	PENN	LAWRENCE	121
420917	PORTER-TOWER JOINT M.A.	TOWER CITY	PENNSYLVANIA	SCHUYLKILL	120
420992	FAIRVIEW TWP AUTH.	NEW CUMBERLAND	PENN	YORK	102
420993	PENN HILLS	PENN HILLS	PENN	ALLEGHENY	121
421004	HARRISBURG SEWERAGE AUTH	HARRISBURG	PENN	DAUPHIN	120
510259	FIELDALE REGIONAL COLL.	FIELDALE	VIRGINIA	HENRY	102
510319	MILL CREEK INTERCEPTOR	LEXINGTON	VIRGINIA	ROCKBRIDGE	102
510331	UPPER OCCOQUAN SAN. DIST.	MANASSAS	VIRGINIA	PRINCE WILLIAM	102
510343	VIRGINIA BEACH SEWERS	VIRGINIA BEACH	VIRGINIA	PRINCESS ANNE	102

TABLE B.1 (Continued)

510355	CLIFTON FORGE COLL	CLIFTON FORGE	VIRGINIA	ALLEGHANY	102
510375	STUART SEWERS	STUART	VIRGINIA	PATRICK	102
510383	ROUND HILL	ROUND HILL	VIRGINIA	LOUDOUN	102
510384	WAVERLY SEWERS	WAVERLY	VIRGINIA	SUSSEX	102
510446	RIVANNA WATER & SEWER AUT	CHARLOTTESVILLE	VIRGINIA	ALBEMARLE	102
510446	RIVANNA WATER & SEWER AUT	CHARLOTTESVILLE	VIRGINIA	ALBEMARLE	102
510447	PLAINS-MARSHALL REGIONAL	MARSHALL	VIRGINIA	FAUQUIER	102
510490	MCKENNEY SEWERS	MCKENNEY	VIRGINIA	DINWIDDIE	102
510498	BLACKSBURG-VPI SAN.AUTH.	BLACKSBURG	VIRGINIA	MONTGOMERY	102
510500	REEDVILLE SD SEWERS	REEDVILLE	VIRGINIA	NORTHUMBERLAND	102
510515	POUND COLLECTION SYSTEM	POUND	VIRGINIA	WISE	102
510528	JAMES CITY CO SD #3 SEWER	WILLIAMSBURG	VIRGINIA	JAMES CITY	102
540208	DELBARTON	DELBARTON	WEST VIRGINIA	MINGO	121
540213	BLUEFIELD	BLUEFIELD	WEST VIRGINIA	MERCER	121
540281	E.KANAWHA P.S. DIST	HOMETOWN	WEST VIRGINIA	PUTNAM	121
540288	NITRO COLLECTION SYSTEM	NITRO	WEST VIRGINIA	KANAWHA/PUTNAM	121
540335	STONEWOOD COLLECTION	STONEWOOD	WEST VIRGINIA	HARRISON	121
540399	COAL HOLLOW	CHARLESTON	WEST VIRGINIA	KANAWHA	121
540427	RIVERBEND P.S. DIST	ST.ALBANS	WEST VIRGINIA	KANAWHA	121
010250	MONROEVILLE	MONROEVILLE	ALABAMA	MONROE	103
010256	NEW HOPE	NEW HOPE	ALABAMA	MADISON	103
010296	TOWN CREEK SEWER SYSTEM	TOWN CREEK	ALABAMA	LAWRENCE	103
120428	PENSACOLA WTW	PENSACOLA	FLORIDA	ESCAMBIA	103
120653	FORCE MAIN & PUMP STATION	DELRAY BEACH	FLORIDA	PALM BEACH	103
130315	RICHMOND HILL SEWERAGE SY	RICHMOND HILL	GEORGIA	BRYAN	103
130357	ALMA	ALMA	GEORGIA	BACON	103
280316	RICHLAND W & S DISTRICT	JACKSON	MISSISSIPPI	RANKIN	118
280380	TOWN CREEK SEWER	JACKSON	MISSISSIPPI	HINDS	118
370364	TARBORO WTW	TARBORO	N. CAROLINA	EDGECOMBE	105
370383	FARMVILLE WTW	FARMVILLE	N. CAROLINA	EDGECOMBE	105

TABLE B.1 (Continued)

370434	SPRING LAKE	SPRING LAKE	NORTH CAROLINA	CUMBERLAND	105
370441	MOORE COUNTY REGIONAL WTW	CARTHAGE	N. CAROLINA	MOORE	105
450265	SANTEE PUBLIC SERVICE DIS	SANTEE	SOUTH CAROLINA	ORANGEBURG	105
450294	GREENVILLE COUNTY SA.	GREENVILLE	SOUTH CAROLINA	GREENVILLE	105
450321	AIKEN CO BD OF COMMISSION	AIKEN	SOUTH CAROLINA	AIKEN	105
450379	ANDERSON CO W & S COMM	ANDERSON	SOUTH CAROLINA	ANDERSON	105
470355	MCEWEN COLLECTION SYSTEM	MCEWEN	TENNESSEE	HUMPHREYS	103
470457	CENTERVILLE SEWERS	CENTERVILLE	TENNESSEE	HICKMAN	103
470463	BLOUNT COUNTY SEWERS	MARYVILLE	TENNESSEE	BLOUNT	103
170508	BUSHNELL SEWERS	BUSHNELL	ILLINOIS	MCDONOUGH	116
170680	SPARTA	SPARTA	ILLINOIS	RANDOLPH	122
170924	SALEM	SALEM	ILLINOIS	MARION	122
170970	O'FALLON	O'FALLON	ILLINOIS	ST. CLAIR	122
171006	HIGHLAND PK.&WEST INT.	BLOOMINGTON	ILLINOIS	MCLEAN	116
171023	BELLEVILLE INTERCEPTORS	BELLEVILLE	ILLINOIS	ST CLAIR	122
171089	GIBSON CITY INTERCEPTOR	GIBSON CITY	ILLINOIS	FORD	116
171196	DUQUOIN	DUQUOIN	ILLINOIS	PERRY	122
171202	MATOON	MATOON	ILLINOIS	COLES	122
171294	WOODRIDGE INTERCEPTORS	WHEATON	ILLINOIS	DUPAGE	106
171294	EAST BRANCH INTERCEPTOR	WOODRIDGE	ILLINOIS	DU PAGE	106
171310	MT. VERNON INTERCEPTORS	MT. VERNON	ILLINOIS	JEFFERSON	122
171365	ARTHUR	ARTHUR	ILLINOIS	DOUGLAS	122
171397	HINSDALE SD SEWERS	HINSDALE	ILLINOIS	DUPAGE	106
171412	CARPENTERSVILLE INTRCPTR	CARPENTERSVILLE	ILLINOIS	KANE	106
171420	BLOOM TOWNSHIP SEWERS	CHICAGO HEIGHTS	ILLINOIS	COOK/WILL	106
171686	NAPERVILLE INTERCEPTOR	NAPERVILLE	ILLINOIS	DUPAGE	106
171714	DEERFIELD INTERCEPTORS	DEERFIELD	ILLINOIS	LAKE	106
171795	EAST SIDE LOW LEVEL INT	ROCKFORD	ILLINOIS	WINNEBAGO	116
171796	ROCKFORD SANITARY DISTRIC	TROCKFORD	ILLINOIS	WINNEBAGO	116
171797	ROCKFORD SANITARY DISTRIC	TROCKFORD	ILLINOIS	WINNEBAGO	116

TABLE B.1 (Continued)

171799	ROCKFORD SANITARY DISTRIC	TROCKFORD	ILLINOIS	WINNEBAGO	116
175023	POPLAR CREEK INTERCEPTOR	CHICAGO	ILLINOIS	COOK	106
175024	MSD OF CHICAGO	CHICAGO	ILLINOIS	COOK	106
175030	MSD OF CHICAGO	CHICAGO	ILLINOIS	COOK	106
175054	INTERCEPTOR	CHICAGO	ILLINOIS	COOK	106
175073	MSD OF CHICAGO	CHICAGO	ILLINOIS	COOK	106
175102	CALOMET INTERCEPTOR	CHICAGO	ILLINOIS	COOK	106
175130	MSD OF CHICAGO	CHICAGO	ILLINOIS	COOK	106
175150	SALT CREEK INTERCEPTOR	CHICAGO	ILLINOIS	COOK	106
175321	MSD OF GREATER CHICAGO	CHICAGO	ILLINOIS	COOK	106
175322	UPPER DES PLAINES INTCPTR	CHICAGO	ILLINOIS	COOK	106
175363	MSD OF CHICAGO	CHICAGO	ILLINOIS	COOK	106
180240	SWEETSER SEWERS	SWEETSER	INDIANA	GRANT	107
180260	NORTH WEBSTER	NORTH WEBSTER	INDIANA	KOSCLUSKO	107
180291	INDEPENDENCE HILL CD COLL	CROWN POINT	INDIANA	LAKE	106
180328	SHELBURN	SHELBURN	INDIANA	SULLIVAN	122
180329	LINDEN COLLECTION SYSTEM	LINDEN	INDIANA	MONTGOMERY	122
180335	ELNORA SEWERS	ELNORA	INDIANA	DAVIESS	122
180346	BIRDSEYE INTERCEPTOR	BIRDSEYE	INDIANA	DUBOIS	122
180354	WILLIAMSPORT SEWERS	WILLIAMSPORT	INDIANA	WARREN	122
180375	ROME CITY	ROME CITY	INDIANA	NOBLE	107
180400	BROOKLYN	BROOKLYN	INDIANA	MORGAN	122
180405	WHITING SEWERS	WHITING	INDIANA	LAKE	106
180425	KNIGHTSVILLE-HARMONY COLL	KNIGHTSVILLE	INDIANA	CLAY	122
180434	CLARKS HILL COLL SYSTEM	CLARKS HILL	INDIANA	TIPPECANOE	122
180445	CARMEL INTERCEPTOR	CARMEL	INDIANA	HAMILTON	122
180467	SEYMOUR FORCE MAIN	SEYMOUR	INDIANA	JACKSON	107
180470	PARAGON SEWERS	PARAGON	INDIANA	MORGAN	122
180473	LAUREL	LAUREL	INDIANA	FRANKLIN	107
180479	SEELYVILLE COLLECTION	SEELYVILLE	INDIANA	VIGO	122

TABLE B.1 (Continued)

180484	CLAY CITY	CLAY CITY	INDIANA	CLAY	122
180494	COVINGTON INTERCEPTOR	COVINGTON	INDIANA	FOUNTAIN	122
180495	DUGGER	DUGGER	INDIANA	SULLIVAN	122
180502	SUNMAN	SUNMAN	INDIANA	RIPLEY	107
180520	NEW PROVIDENCE COLL SYS	NEW PROVIDENCE	INDIANA	CLARK	107
180526	STAUNTON COLL SYS	STAUNTON	INDIANA	CLAY	122
180528	MARTINSVILLE INTERCEPTORS	MARTINSVILLE	INDIANA	MORGAN	122
180533	PRINCETON SEWERS	PRINCETON	INDIANA	GIBSON	122
180542	HUNTINGTON	HUNTINGTON	INDIANA	HUNTINGTON	107
180547	NORTH AREA INTERCEPTORS	MUNCIE	INDIANA	DELAWARE	107
180555	PENNVILLE SEWERS	PENNVILLE	INDIANA	JAY	107
180574	BOSWELL	BOSWELL	INDIANA	BENTON	107
180591	CONVERSE	CONVERSE	INDIANA	MIAMI	107
180638	BICKNELL SEWERS	BICKNELL	INDIANA	KNOX	122
180767	BLUFFTON SEWERS	BLUFFTON	INDIANA	WELLS	107
180866	GREENWOOD	GREENWOOD	INDIANA	JOHNSON	122
180874	RICHMOND AREA REGIONAL SD	RICHMOND	INDIANA	WAYNE	107
180877	INDIANAPOLIS, ETAL.	INDIANAPOLIS	INDIANA	MARION	122
262034	HARBOR SPRINGS AREA SEWER	HARBOR SPRINGS	MICHIGAN	EMMET	111
262053	CHATHAM INTERCEPTOR	CHATHAM	MICHIGAN	ALGER	116
262088	MOUNT CLEMENS	MOUNT CLEMENS	MICHIGAN	MACOMB	111
262110	CADILLAC	CADILLAC	MICHIGAN	WEXFORD	111
262148	GRATIOT CO.-FULTON DPW	ITHACA	MICHIGAN	GRATIOT	111
262314	CHEBOYGAN AREA WW MANAG.	CHEBOYGAN	MICHIGAN	CHEBOYGAN	111
262345	BAY CITY RELIEF SEWERS	BAY CITY	MICHIGAN	BAY	111
262397	MONROE CO. DRAIN COMM	MONROE	MICHIGAN	MONROE	111
262449	LENAWEE CO. DRAIN COMM.	ADRIAN	MICHIGAN	LENAWEE	111
262462	PT. HURON TWP.	PORT HURON	MICHIGAN	ST. CLAIR	111
262462	PORT HURON	PORT HURON	MICHIGAN	ST. CLAIR	111
262491	MT CLEMENS & CLINTON AREA	MT CLEMENS	MICHIGAN	MACOMB	111

TABLE B.1 (Continued)

262501	OWOSSO	OWOSSO	MICHIGAN	SHIAWASEE	111
262503	BIG RAPIDS INTERCEPTOR	BIG RAPIDS	MICHIGAN	MECOSTA	111
262504	NILES TOWNSHIP SEWERS	ST JOSEPH	MICHIGAN	BERRIEN	111
262527	OWOSSO-CALEDCNIA SEWERS	CORUNNA	MICHIGAN	SHIAWASEE	111
262535	MASON	MASON	MICHIGAN	INGHAM	111
262541	IONIA SEWERS	IONIA	MICHIGAN	IONIA	111
262543	LUCE CO. DPW	NEWBERRY	MICHIGAN	LUCE	116
262597	GRATIOT CO.-ALMA,ARCADA..	ITHACA	MICHIGAN	GRATIOT	111
262613	MONROE CO.	MONROE	MICHIGAN	MONROE	111
262614	MONROE CO.FRENCHTOWNBEACH	MONROE	MICHIGAN	MONROE	111
262639	ALLEGAN	ALLEGAN	MICHIGAN	ALLEGAN	111
262646	ST. CLAIR CO.	PORT HURON	MICHIGAN	ST. CLAIR	111
270043	DOVER-EYOTA SEWERS	ST CHARLES	MINNESOTA	WINONA	117
270720	VIRGINIA	VIRGINIA	MINNESOTA	ST. LOUIS	117
270720	VIRGINIA	VIRGINIA	MINNESOTA	ST. LOUIS	117
270747	ST CLOUD	ST CLOUD	MINNESOTA	STEARNS	117
270748	WESTERN LAKE SUPERIOR,ETC	DULUTH	MINNESOTA	ST. LOUIS	117
270818	STOCKTON COLLECTION SYS	STOCKTON	MINNESOTA	WINONA	117
270824	ST.PETER & KASOTA,ETAL.	ST. PETER	MINNESOTA	LE SUEUR	117
270837	TAUNTON COLL SYSTEM	TAUNTON	MINNESOTA	LYON	117
270838	ZIMMERMAN INTERCEPTOR	ZIMMERMAN	MINNESOTA	SHERBORNE	117
270844	ALEXANDRIA LAKE AREA SD	ALEXANDRIA	MINNESOTA	DOUGLAS	117
270845	BREEZY POINT FORCE MAIN	BREEZY POINT	MINNESOTA	CROW WING	117
270949	MARSHALL FORCE MAIN	MARSHALL	MINNESOTA	LYON	117
270970	MADISON LAKE	MADISON LAKE	MINNESOTA	BLUE EARTH	117
390491	WOOD COUNTY SS # 400	BOWLING GREEN	OHIO	WOOD	111
390542	PORTAGE CO. RAVENNA S.D.	RAVENNA	OHIO	PORTAGE	108
390579	HAMILTON COUNTY INTERCPTR	CINCINNATI	OHIO	HAMILTON	107
390586	MINERAL CITY	MINERAL CITY	OHIO	TUSCARAWAS	121
390624	GEAUGA CO.,MCFARLAND CRK	CHARDON	OHIO	GAAUGA	108

TABLE B.1 (Continued)

390626	LIMA INTERCEPTORS	LIMA	OHIO	ALLEN	107
390630	BURTON SEWERAGE SYSTEM	BURTON	OHIO	GEAUGA	108
390640	FAYE-WOODS INTERCEPTOR	AKRON	OHIO	SUMMIT	108
390644	CIRCLEVILLE INTERCEPTORS	CIRCLEVILLE	OHIO	PICKAWAY	108
390648	OREGON INTERCEPTORS	OREGON	OHIO	LUCAS	111
390657	MEDINA COUNTY INTERCEPTOR	MEDINA	OHIO	MEDINA	108
390659	NORTHWEST AREA INTERCEPT.	CLEVELAND	OHIO	CUYAHOGA	108
390663	HASKINS COLL SYSTEM	HASKINS	OHIO	WOOD	111
390680	NEW KNOXVILLE COLL SYSTEM	NEW KNOXVILLE	OHIO	AUGLAIZE	107
390683	FRENCH CREEK SEWERS	NORTH RIDGEVILL	OHIO	LORAINE	108
390684	MEANDER WATERSHED, ETAL.	YOUNGSTOWN	OHIO	MAHONING	121
390702	MONTGOMERY CC INTERCEPTOR	DAYTON	OHIO	MONTGOMERY	107
390717	PROSPECT	PROSPECT	OHIO	MARION	108
390718	YOUNGSTOWN	YOUNGSTOWN	OHIO	MAHONING	121
390728	YOUNGSTOWN	YOUNGSTOWN	OHIO	MAHONING	121
390733	TRENTON SEWERAGE SYSTEM	TRENTON	OHIO	BUTLER	107
390735	LORAIN SEWERS	LORAIN	OHIO	LORAINE	108
390744	E SCIOTO BRANCH SEWER	COLUMBUS	OHIO	FRANKLIN	108
390753	BLOOMINGBURG	BLOOMINGBURG	OHIO	FAYETTE	107
390754	SHERWOOD COLL SYSTEM	SHERWOOD	OHIO	DEFIANCE	111
390765	BROOKSIDE ESTATES INTRCPT	COLUMBUS	OHIO	FRANKLIN	108
390875	MIAMI CONS DIST SEWERS	SPRINGBORO	OHIO	WARREN	107
390895	DUBLIN SEWERS	DUBLIN	OHIO	FRANKLIN	108
390899	WESTERVILLE SEWERS	WESTERVILLE	OHIO	FRANKLIN	108
390903	WOOD COUNTY	BOWLING GREEN	OHIO	WOOD	111
390915	WEST TWIN CREEK INTERCPTR	GERMANTOWN	OHIO	MIAMI	107
390926	ORCHARD HILL INTERCEPTOR	MIAMISBURG	OHIO	MONTGOMERY	107
390940	STARK COUNTY SEWERS	CANTON	OHIO	STARK	108
390982	SOUTH POINT COLL SYSTEM	SOUTH POINT	OHIO	LAWRENCE	121
390990	CEDAR POINT, SANDUSKY	SANDUSKY	OHIO	ERIE	108

TABLE B.1 (Continued)

391001	PREBLE COUNTY COLL SYSTEM	EATON	OHIO	PREBLE	107
391005	ASHLEY	COLUMBUS	OHIO	DELAWARE	108
391008	XENIA	XENIA	OHIO	GREENE	107
391104	LUCAS CTY-MCCORD RD INT	MAUMEE	OHIO	LUCAS	111
550569	MT HOREB INTERCEPTOR	MT HOREB	WISCONSIN	DANE	116
550573	LOMIRA INTERCEPTOR	LOMIRA	WISCONSIN	DODGE	116
550625	MONTREAL INTERCEPTOR	MONTREAL	WISCONSIN	IRON	117
550631	OCONOMOWOC INTERCEPTOR	OCONOMOWOC	WISCONSIN	WAUKESHA	116
550670	INTERCEPTOR SEWER	MILWAUKEE	WISCONSIN	MILWAUKEE	116
550787	MARSHFIELD SEWERS	MARSHFIELD	WISCONSIN	WOOD	116
550790	STOUGHTON INTERCEPTOR	STOUGHTON	WISCONSIN	DANE	116
550820	NORTHERN MORAINE UC SEWER	ELKHART LAKE	WISCONSIN	SHEBOYGAN	116
550821	HEART OF THE VALLEY SEWER	KAUKAUNA	WISCONSIN	OUTAGAMIE	116
050346	PARAGOULD INTERCEPTOR	PARAGOULD	ARKANSAS	GREENE	109
050350	GREENBRIER SEWERAGE SYST	GREENBRIER	ARKANSAS	FAULKNER	109
050358	CENTERTON COLLECTION SYS	CENTERTON	ARKANSAS	BENTON	109
050367	WEST SIDE WW TRT WORKS	JONESBORO	ARKANSAS	CRAIGHEAD	109
220292	JEANERETTE SEWERAGE SYST	JEANERETTE	LOUISIANA	IBERIA	118
220295	BASILE WW COLLECTION SYST	BASILE	LOUISIANA	EVANGELINE	118
220305	RUSTON WW COLLECTION SYST	RUSTON	LOUISIANA	LINCOLN	118
220307	GILBERT SEWERAGE SYSTEM	GILBERT	LOUISIANA	FRANKLIN	118
220309	VIVIAN SEWERAGE SYSTEM	VIVIAN	LOUISIANA	CADDO	118
220310	PLEASANT HILL SEWERAGE	PLEASANT HILL	LOUISIANA	SABINE	118
220314	ROSEPINE SEWERAGE SYSTEM	ROSEPINE	LOUISIANA	VERNON	118
220321	LIVINGSTON SEWERAGE SYST	LIVINGSTON	LOUISIANA	LIVINGSTON	118
220340	WEST OUCHITA COLL SYSTEM	WEST MONROE	LOUISIANA	OUCHITA	118
350171	LAS CRUCES	LAS CRUCES	NEW MEXICO	DONA ANA	109
350188	LORDSBURG SEWERAGE SYSTEM	LORDSBURG	NEW MEXICO	HILDALGO	109
351029	PORTALES SEWERAGE SYSTEM	PORTALES	NEW MEXICO	ROOSEVELT	109
400413	JANEAA COLLECTION SYSTEM	SAPULPA	OKLAHOMA	CREEK	109

TABLE B.1 (Continued)

400537	WEWOKA SEWERS	WEWOKA	OKLAHOMA	SEMINOLE	109
400563	SEWCO INTERCEPTOR	TULSA	OKLAHOMA	TULSA	109
400577	KETCHUM SEWERAGE SYSTEM	KETCHUM	OKLAHOMA	CRAIG	109
400638	AMBER COLLECTION SYSTEM	AMBER	OKLAHOMA	GRADY	109
400644	COTTON CO RWD COLL SYSTEM	RANDLETT	OKLAHOMA	COTTON	109
400648	ALTUS INTERCEPTOR	ALTUS	OKLAHOMA	JACKSON	109
400674	STILLWATER INTERCEPTORS	STILLWATER	OKLAHOMA	PAYNE	109
400682	PERRY SEWERS	PERRY	OKLAHOMA	NOBLE	109
400743	MARTHA SEWERS	MARTHA	OKLAHOMA	JACKSON	109
480799	BLOOMING GROVE SEWERS	BLOOMING GROVE	TEXAS	NAVARRO	123
480856	CROCKETT CITY INTERCEPTOR	CROCKETT	TEXAS	HOUSTON	112
480878	MERTZON SEWERAGE SYSTEM	MERTZON	TEXAS	IRION	112
480899	SAN JUAN SEWERS	CORPUS CHRISTI	TEXAS	NUECES	112
480931	PALESTINE SEWERAGE SYSTEM	PALESTINE	TEXAS	ANDERSON	112
480938	KERRVILLE SEWERAGE SYSTEM	KERRVILLE	TEXAS	KERR	112
480952	SULFUR SPRINGS SEWERAGE	SULFUR SPRINGS	TEXAS	HOPKINS	109
480981	CROSBY COLLECTION SYSTEM	CROSBY	TEXAS	HARRIS	112
481078	LOMAX SEWERAGE SYSTEM	LOMAX	TEXAS	HARRIS	112
481110	BUENA VISTA INTERCEPTOR	DEL RIO	TEXAS	VAL VERDE	112
481168	GILMER COLLECTION SYSTEM	GILMER	TEXAS	UPSHUR	109
190605	HARLAN INTERCEPTOR	HARLAN	IOWA	SHELBY	113
190617	WOOLSTOCK SEWERS	WOOLSTOCK	IOWA	WEBSTER	113
190637	SPENCER INTERCEPTOR	SPENCER	IOWA	CLAY	113
200415	JUNCTION CITY INTERCEPTOR	JUNCTION CITY	KANSAS	GEARY	113
200429	ATLANTA COLLECTION SYSTEM	ATLANTA	KANSAS	COWLEY	113
200450	SILVER LAKE SEWER	SILVER LAKE	KANSAS	SHAWNEE	113
200576	LA HARPE WWTP & SEWERS	LA HARPE	KANSAS	ALLEN	113
290524	MONETT SEWER SYSTEM	MONETT	MISSOURI	BARRY	113
290603	NEVADA WWTP & INTERCEPTOR	NEVADA	MISSOURI	VERNON	113
290646	WYATT SEWER SYSTEM	WYATT	MISSOURI	MISSISSIPPI	122

TABLE B.1 (Continued)

290674	WARRENTON SEWERS	WARRENTON	MISSOURI	WARREN	122
290689	ST. ROBERT INTERCEPTOR	ST. ROBERT	MISSOURI	PULASKI	122
290696	CARUTHERSVILLE COLL. SYS.	CARUTHERSVILLE	MISSOURI	PEMISCOTT	122
310407	BLAIR SEWER SYSTEM	BLAIR	NEBRASKA	WASHINGTON	113
310421	SPRINGFIELD WWTP & SEWERS	SPRINGFIELD	NEBRASKA	SARPY	113
310433	YORK SEWER SYSTEM	YORK	NEBRASKA	YORK	113
310435	ARLINGTON SEWER SYSTEM	ARLINGTON	NEBRASKA	WASHINGTON	113
080321	FT. COLLINS INTERCEPTOR	FT. COLLINS	COLORADO	LARIMER	110
080322	UPPER THOMPSON WWTP	ESTES PARK	COLORADO	LARIMER	110
080337	PARADISE HILLS INTERCEPT.	GRAND JUNCTION	COLORADO	MESA	110
080352	LONGMONT WWTP & SEWER SYS	LONGMONT	COLORADO	BOULDER	110
080369	PLATTE II INTERCEPTOR	DENVER	COLORADO	DENVER	110
080370	PLATTE II INTERCEPTOR	DENVER	COLORADO	DENVER	110
300194	FLAXVILLE SEWERS	FLAXVILLE	MONTANA	DANIELS	124
300199	MISSOULA STP & INT	MISSOULA	MONTANA	MISSOULA	124
380294	ENDERLIN WTW & SS	ENDERLIN	NORTH DAKOTA	RANSOM	117
380313	SHELDON LAGOON AND CS	SHELDON	NORTH DAKOTA	RANSOM	117
380332	CRARY SEWERS	CRARY	NORTH DAKOTA	RAMSEY	117
460222	VIVIAN LAGOON & COLL. SYS	VIVIAN	SOUTH DAKOTA	LYMAN	117
460238	RAMONA SEWER SYSTEM	RAMONA	SOUTH DAKOTA	LAKE	117
460240	RAPID VALLEY COLLECTION	RAPID CITY	SOUTH DAKOTA	PENNINGTON	117
460259	HENRY COLLECTION SYSTEM	HENRY	SOUTH DAKOTA	CODINGTON	117
460264	PRAIRIE MEADOWS COLL. SYS	SIOUX FALLS	SOUTH DAKOTA	MINNEHAHA	117
460472	BRUCE LAGOON & COLL. SYS.	BRUCE	SOUTH DAKOTA	BROOKINGS	117
490142	CEDAR CITY WWTP	CEDAR CITY	UTAH	IRON	110
490152	HYRUM CITY WWTP & SEWERS	HYRUM CITY	UTAH	CACHE	110
490175	TROPIC TOWN OF	TROPIC	UTAH	GARFIELD	110
490181	EMERY TOWN PONDS & COLL.	EMERY TOWN	UTAH	EMERY	110
490182	SEWER LINE EXTENSION	PRICE	UTAH	CARBON	110
560103	THERMOPOLIS INTERCEPTOR	THERMOPOLIS	WYOMING	HOT SPRINGS	110

TABLE B.1 (Continued)

560104	COWLEY STP & COLLECTOR	COWLEY	WYOMING	BIG HORN	110
560110	LABARGE WWTP & COLL. SYS.	LABARGE	WYOMING	LINCOLN	110
040147	RILLITO INTERCEPTOR	TUCSON	ARIZONA	PIMA	110
040160	SOUTHWEST INTERCEPTOR	TUCSON	ARIZONA	PIMA	110
040162	WINDOW ROCK-FT.DEFIANCE	FT. DEFIANCE	ARIZONA	APACHE	110
060740	NORTH POINT CROSSTOWN INT	SAN FRANCISCO	CALIFORNIA	SAN FRANCISCO	123
060763	KERMAN INTERCEPTORS	KERMAN	CALIFORNIA	FRESNO	123
060772	FORCE MAIN	SCOTTS VALLEY	CALIFORNIA	SANTA CRUZ	123
060778	ALTAVILLE INTERCEPTOR	ANGELS	CALIFORNIA	CALAVERAS	123
060786	BOLINAS COLLECTION	BOLINAS	CALIFORNIA	MARIN	123
060810	SUISUN-CORDELIA SYSTEM	FAIRFIELD	CALIFORNIA	SOLANO	123
060813	INYO CO. SEWERS	BISHOP	CALIFORNIA	INYO	123
060816	REGIONAL COLLECTION	N. LAKEPORT	CALIFORNIA	LAKE	123
060823	MT. SHASTA INTERCEPTOR	MT. SHASTA	CALIFORNIA	SISKIYOU	123
060840	NORTH INTERCEPTOR	YUBA CITY	CALIFORNIA	SUTTER	123
060859	MONTCLAIR INTERCEPTOR	MONTCLAIR	CALIFORNIA	SAN BERNARDINO	114
060915	NAPA INTERCEPTOR	NAPA	CALIFORNIA	NAPA	123
060938	INTERCEPTOR	SACRAMENTO	CALIFORNIA	SACRAMENTO	123
060940	GRAND TERRACE COLLECTION	COULTON	CALIFORNIA	SAN BERNARDINO	114
060950	ESTERO INTERCEPTOR	SAN MATEO	CALIFORNIA	SAN MATEO	123
060956	SHASTA DAM AREA COLLECTIO	CENTRAL VALLEY	CALIFORNIA	SHASTA	123
060957	SANTA ANA INTERCEPTOR	SANTA ANA	CALIFORNIA	ORANGE	114
060961	NORTH-SOUTH INTERCEPTOR	STOCKTON	CALIFORNIA	SAN JOAQUIN	123
060967	EAST SONORA INTERCEPTOR	SONORA	CALIFORNIA	TUOLUMNE	123
061062	MCKINLEYVILLE COLLECTION	MCKINLEYVILLE	CALIFORNIA	HUMBOLT	123
061121	TAHOE-TRUCKEE INTERCEPTOR	TAHOE VISTA	CALIFORNIA	NEVADA	123
061138	LOS COYOTES INTERCEPTOR	LOS ANGELES	CALIFORNIA	LOS ANGELES	114
061151	HERNDON INTERCEPTOR	FRESNO	CALIFORNIA	FRESNO	123
150050	HANAPEPE-ELEELE WWTF	HANAPEPE-ELEELE	HAWAII	KAUAI	127
150054	LAHAINA SEWERS	LAHAINA	HAWAII	MAUI	127

TABLE B.1 (Continued)

150057	KULAIMANU SEWERS	KULAIMANU	HAWAII	HAWAII	127
320076	YERINGTON SEWERS	YERINGTON	NEVADA	LYON	123
320083	NELLIS INTERCEPTOR PH. I	LAS VEGAS	NEVADA	CLARK	114
320084	EAST LAS VEGAS LIFT STA	EAST LAS VEGAS	NEVADA	CLARK	114
320088	INCLINE COLLECTION	INCLINE VILLAGE	NEVADA	WASHOE	123
320091	BEATTY SEWERS	BEATTY	NEVADA	NYE	123
320094	FERNLEY INTERCEPTOR	FERNLEY	NEVADA	LYON	123
320097	MCDERMITT SEWERS	MCDERMITT	NEVADA	HUMBOLDT	114
320106	NELLIS INTERCEPTOR	LAS VEGAS	NEVADA	CLARK	114
320107	OVERTON STP	OVERTON	NEVADA	CLARK	114
320108	SEARCHLIGHT SEWERS	SEARCHLIGHT	NEVADA	CLARK	114
660004	MANGILAO INTERCEPTOR	MANGILAO	GUAM		126
660005	DEDEDO-YIGO INTERCEPTOR	NORTHERN DIST	GUAM		126
660007	NORTHERN DIST. WWTF	NORTHERN DISTR.	GUAM		126
660008	BARRIGADA SEWERAGE	BARRIGADA VILLA	GUAM		126
020038	KODIAK SYSTEM	KODIAK	ALASKA	KODIAK IS	126
020039	FAIRBANKS WWTP	FAIRBANKS	ALASKA	NORTH STAR	126
020043	HAINES STP & COLL	HAINES	ALASKA	HAINES	126
020046	SKAGWAY STP & COLLECTION	SKAGWAY	ALASKA	SKAGWAY	126
020047	PETERSBURG WWTP	PETERSBURG	ALASKA	WRANGELL	126
160144	PARIS SEWERAGE	PARIS	IDAHO	BEAR LAKE	123
160156	WOODRUFF AVE INT.	IDAHO FALLS	IDAHO	BONNEVILLE	123
160176	SEWER SYSTEM	SALMON	IDAHO	LEMHI	123
160185	SOUTH FORK COEUR D'ALENE	WALLACE	IDAHO	SHOSHONE	124
160204	CULDESAC WWTF	CULDESAC	IDAHO	NEZ PERCE	124
410365	DEPOE BAY STP	DEPOE BAY	OREGON	LINCOLN	123
410390	INTERCEPTOR SYSTEM	PENDLETON	OREGON	UMATILLA	123
410411	REDWOOD SANITARY DISTRICT	GRANTS PASS	OREGON	JOSEPHINE	123
410416	CLOVERDALE STP	CLOVERDALE	OREGON	TILLAMOOK	123
410485	BEAVERTON-ROCK CREEK INT.	HILLSBORO	OREGON	WASHINGTON	123

TABLE B.1 (Continued)

410555	GLEN CREEK TRUNK SEWER	SALEM	OREGON	POLK	123
530466	BIRCH PAY(WHATEUM COWD#8)	BLAINE	WASHINGTON	WHATCOM	124
530470	SEWARD PARK INTERCEPTOR	SEATTLE	WASHINGTON	KING	124
530488	WESTPORT WWTF	WESTPORT	WASHINGTON	GRAYS HARBOR	124
530521	WOODLAWN SEWERS	HOQUIAM	WASHINGTON	GRAYS HARBOR	124
530538	TAUSICK WAY INTERCEPTOR	WALLAWALLA	WASHINGTON	WALLA WALLA	124
530549	STEVENS PASS-YODELIN STP	KIRKLAND	WASHINGTON	KING/CHELAN	124
530553	WHITE SWAN W & S	YAKIMA INDIAN	WASHINGTON	YAKIMA	124
530581	FOX AVE INTERCEPTOR	SEATTLE	WASHINGTON	KING	124
530740	GLENWOOD STP(KLICKITAT CO	GOLDENDALE	WASHINGTON	KLICKITAT	124

TABLE B.2

DISTRIBUTION OF SEWERS SAMPLE
BY PIPE TYPE AND DEPTH

(DIAMETER: 04")

	PVC			AC			VC			CI			RCP			DIP			OTHER			TOTALS
	DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			
	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	
REGION 10													1	3								4
WASHINGTON													1	3								4
NATIONAL TOTALS													1	3								4

(DIAMETER: 06")

	PVC			AC			VC			CI			RCP			DIP			OTHER			TOTALS
	DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			
	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	
REGION 01					2			7														9
NEW HAMPSHIRE					2			7														9
REGION 03							1	4	2												1	8
MARYLAND							1	4	2													7
PENNSYLVANIA																					1	1
REGION 05		3			2			3									1			2		11
ILLINOIS																	1					1
MICHIGAN		2						3														5
OHIO		1			2															2		5
REGION 06							5	7	1	2	2											17
ARKANSAS							2			1												3
TEXAS							3	7	1	1	2											14
REGION 08		5	1																			6
NORTH DAKOTA		1																				1
SOUTH DAKOTA		4	1																			5
REGION 10													1	3								4
WASHINGTON													1	3								4
NATIONAL TOTALS		8	1		4		6	21	3	2	2		1	3			1			2	1	55

TABLE B.2 (Continued)

DISTRIBUTION OF SEWERS SAMPLE
BY PIPE TYPE AND DEPTH

(DIAMETER: 08")

	PVC			AC			VC			CI			RCP			DIP			OTHER			
	DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			
	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	TOTALS
REGION 01					8	5	1	19	8								4					45
CONNECTICUT																	1					1
MASSACHUSETTS					5	2	1	1														9
NEW HAMPSHIRE					3	3		9	6								1					22
VERMONT								9	2								2					13
REGION 02				12	33	25	5	36	15							4	14	8				152
NEW JERSEY				10	24	23	3	22	10							4	12	8				116
NEW YORK				2	9	2	2	14	5								2					36
REGION 03	5	16	3	11	42	16	13	50	23	3	11	1				2	4		1	3		204
DELAWARE	1	3						2	2													8
MARYLAND				1	4		2	4	1													12
PENNSYLVANIA	1	2		5	27	16	3	25	19	1	6	1							1	3		110
VIRGINIA	3	11	3	5	9		2	8	1	2	5					2	4					55
WEST VIRGINIA					2		6	11														19
REGION 04				1	4	1	7	20	5	1	4					2	1					46
ALABAMA							3	9	2													14
GEORGIA				1	4	1	2	4	3	1	3											19
NORTH CAROLINA							1	2								1						4
SOUTH CAROLINA							1	5			1					1	1					9
REGION 05	1	18	11	2	15	2	10	84	55	3	6					1	3		3	22	10	246
ILLINOIS								3								1						4
INDIANA	1	8	2	2	8	1	10	45	21	3	6								2	13	2	124
MICHIGAN		2			4			11														17
MINNESOTA		4	3					12	21								2					42
OHIO		4	6		3	1		13	13								1		1	9	8	59
REGION 06							12	41	7	1	2					1	1		2	4	2	73
ARKANSAS							1			1												2
LOUISIANA							2	4											2	4	2	14
OKLAHOMA							1	3														4
TEXAS							8	34	7		2					1	1					53
REGION 07							1	3														4
KANSAS							1	3														4
REGION 08	1	12	8		2																	23
COLORADO					2																	2
NORTH DAKOTA	1	7	3																			11
SOUTH DAKOTA		5	5																			10
REGION 10													1	3								4
WASHINGTON													1	3								4
NATIONAL TOTALS	7	46	22	26	104	49	49	253	113	8	23	1	1	3		10	27	8	6	29	12	797

TABLE B.2 (Continued)

DISTRIBUTION OF SEWERS SAMPLE
BY PIPE TYPE AND DEPTH

(DIAMETER: 10")

	PVC			AC			VC			CI			RCP			DIP			OTHER			
	DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			
	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	TOTALS
REGION 01					4			15	6		2						6	2				35
CONNECTICUT																	2					2
MAINE								1	1													2
MASSACHUSETTS					3																	3
NEW HAMPSHIRE					1			4	1		2											8
VERMONT								10	4								4	2				20
REGION 02				4	18	17	1	17	1				1	3		1	1					64
NEW JERSEY				4	15	13	1	9														42
NEW YORK					3	4		8	1				1	3		1	1					22
REGION 03	2	7	1	8	32	15	2	32	9			2							1	4	1	116
DELAWARE	1	4	1					2	1													9
MARYLAND				1	4	6		1				1										13
PENNSYLVANIA				5	24	9	1	23	8			1							1	4	1	77
VIRGINIA	1	3		2	4																	10
WEST VIRGINIA							1	6														7
REGION 04	3	15	9	3	16	7	7	21	1	2	7					4	7					102
ALABAMA							3	12	1													16
FLORIDA											1											1
GEORGIA				1	4	4	2	4		2	5											22
MISSISSIPPI				2	12	3																17
SOUTH CAROLINA							2	5			1					1						9
TENNESSEE	3	15	9													3	7					37
REGION 05		8	6		14	7	6	48	34	1	3				1		2	1	2	20	11	164
ILLINOIS								2	4													6
INDIANA		3			8	5	6	22	10	1	3								1	12	3	74
MICHIGAN		2			4			8														14
MINNESOTA		1						9	11								1	1				23
OHIO		2	6		2	2		7	9						1		1		1	8	8	47
REGION 06							8	22	4	1	2						1					38
LOUISIANA							2	4	1													7
TEXAS							6	18	3	1	2						1					31
REGION 08		4																				4
SOUTH DAKOTA		4																				4
REGION 10													1	3								4
WASHINGTON													1	3								4
NATIONAL TOTALS	5	34	16	15	84	46	24	155	55	4	14	2	2	6	1	5	17	3	3	24	12	527

TABLE B.2 (Continued)

DISTRIBUTION OF SEWERS SAMPLE
BY PIPE TYPE AND DEPTH

(DIAMETER: 12")

	PVC			AC			VC			CI			RCP			DIP			OTHER			TOTALS
	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	
REGION 01					10			12	5		1			1			1	1				31
CONNECTICUT								2									1					3
MAINE														1								1
MASSACHUSETTS					8																	8
NEW HAMPSHIRE					2			4	2		1							1				10
VERMONT								6	3													9
REGION 02				2	18	18	4	23	7	1				1		1	3	3				81
NEW JERSEY				1	13	14	3	15	6							1	3	3				59
NEW YORK				1	5	4	1	8	1	1				1								22
REGION 03		3		9	30	6	3	13	5		1	1		4	1				1	2	1	80
DELAWARE		3						1	1													5
MARYLAND				3	6	3																12
PENNSYLVANIA				4	18	3		8	4		1	1		4	1				1	2	1	48
VIRGINIA				2	6		1	3														12
WEST VIRGINIA							2	1														3
REGION 04	2	8		2	15	8	1	9	3		2	2				2	1					55
ALABAMA								3														3
GEORGIA				1	5			3	3		2	2										16
MISSISSIPPI				1	10	8																19
SOUTH CAROLINA							1	3								1	1					6
TENNESSEE	2	8														1						11
REGION 05		5	6		4	2	3	61	48					1	1	1	2	6	2	13	14	169
ILLINOIS							1	5	3							1						10
INDIANA							2	17	7										1	7	4	38
MICHIGAN		4	2		2			9	3													20
MINNESOTA		1	4		2	2		9	26													44
OHIO								21	9					1	1		2	6	1	6	10	57
REGION 06		4	4				8	33	4	2	10										3	68
LOUISIANA								2														2
TEXAS		4	4				8	31	4	2	10										3	66
REGION 08		4																				4
SOUTH DAKOTA		4																				4
NATIONAL TOTALS	2	24	10	13	77	34	19	151	72	3	14	3		7	2	4	7	10	3	15	18	488

TABLE B.2 (Continued)

DISTRIBUTION OF SEWERS SAMPLE
BY PIPE TYPE AND DEPTH

(DIAMETER: 14")

	PVC			AC			VC			CI			RCP			DIF			OTHER			
	DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			TOTALS
	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	
REGION 02				1	7	7										1	4	1				21
NEW JERSEY					5	7																12
NEW YORK				1	2											1	4	1				9
REGION 03													2			1	1					4
VIRGINIA																1	1					2
MINNESOTA													2									2
NATIONAL TOTALS				1	7	7							2			2	5	1				25

TABLE B.2 (Continued)

DISTRIBUTION OF SEWERS SAMPLE BY PIPE TYPE AND DEPTH

(DIAMETER: 15")

	PVC			AC			VC			CI			RCP			DIP			OTHER			
	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	TOTALS
REGION 01								6	4				1	4	2							17
CONNECTICUT													1	3								4
MAINE														1	2							3
NEW HAMPSHIRE								2	2													4
VERMONT								4	2													6
REGION 02				2	5	4	2	9	4				1	2								29
NEW JERSEY				1	3	2																6
NEW YORK				1	2	2	2	9	4				1	2								23
REGION 03				5	20	9	4	10	5					3	1				1	3		61
DELAWARE							1	4	1													6
PENNSYLVANIA				5	20	9		2	4					3	1							44
VIRGINIA							1	3											1	3		8
WEST VIRGINIA							2	1														3
REGION 04	2	7			4	10	2	7					2	4	3							41
ALABAMA							1	3														4
GEORGIA													1									1
MISSISSIPPI					4	10																14
NORTH CAROLINA													1	4	3							8
SOUTH CAROLINA							1	4														5
TENNESSEE	2	7																				9
REGION 05		1	1		2		1	24	5				1	20	18					6	8	87
ILLINOIS							1	6						4								11
INDIANA								8	1				1	4	1							15
MICHIGAN					2			1						6	1							10
MINNESOTA														6	13							19
OHIO		1	1					9	4						3					6	8	32
REGION 06							3	9									1					13
TEXAS							3	9									1					13
REGION 08		4																				4
COLORADO		1																				1
SOUTH DAKOTA		3																				3
NATIONAL TOTALS	2	12	1	7	31	23	12	65	18				5	33	24		1		1	9	8	252

TABLE B.2 (Continued)

DISTRIBUTION OF SEWERS SAMPLE
BY PIPE TYPE AND DEPTH

(DIAMETER: 16")

	PVC			AC			VC			CI			RCP			DIP			OTHER			
	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	TOTALS
REGION 01					3	2					3											8
MASSACHUSETTS					3	2																5
NEW HAMPSHIRE											3											3
REGION 02					7	3	1	8	5				1	2	5	1	2					35
NEW JERSEY					2	2	1	8	5				1	2	5	1	2					29
NEW YORK					5	1																6
REGION 03					1												2	2				5
DELAWARE																	2	2				4
VIRGINIA					1																	1
REGION 04										1	2					3	6	3				15
MISSISSIPPI																1	1	2				4
SOUTH CAROLINA										1	2					1	4	1				9
TENNESSEE																1	1					2
REGION 05																	1					1
INDIANA																	1					1
REGION 10					3	1																4
WASHINGTON					3	1																4
NATIONAL TOTALS					14	6	1	8	5	1	5		1	2	5	4	11	5				68

TABLE B.2 (Continued)

DISTRIBUTION OF SEWERS SAMPLE
BY PIPE TYPE AND DEPTH

(DIAMETER: 18")

	PVC			AC			VC			CI			RCP			DIP			OTHER			
	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	TOTALS
REGION 01					6								1	7			3					17
CONNECTICUT													1	6			3					10
MAINE														1								1
MASSACHUSETTS					6																	6
REGION 02				2	13	8	2	13	5				2	7	3			1				56
NEW JERSEY				1	6	5	1	3					1	4	3							24
NEW YORK				1	7	3	1	8	4				1	3				1				29
VIRGIN ISLANDS								2	1													3
REGION 03				6	24	16	2	12	2			1		2	1		1	1	1			69
DELAWARE								3									1	1				5
MARYLAND				1	1																	2
PENNSYLVANIA				5	21	16	2	9	2			1		2	1							59
VIRGINIA					2														1			3
REGION 04				1	4		2	12	1				4	15	6	3	7	5				60
FLORIDA								1														1
MISSISSIPPI																	2	4				6
NORTH CAROLINA				1	4		1	4	1				2	8	6	1						28
SOUTH CAROLINA							1	7								1	4	1				14
TENNESSEE													2	7		1	1					11
REGION 05				1	3		1	16	9					20	29		1	1		7	5	93
ILLINOIS				1	3			2						2	10							18
INDIANA								10	3											2		15
MICHIGAN														9	4							13
MINNESOTA														8	9			1				18
OHIO							1	4	6					1	6		1			5	5	29
REGION 06							5	18	4		5					1		10				43
TEXAS							5	18	4		5					1		10				43
REGION 10					2	1																3
WASHINGTON					2	1																3
NATIONAL TOTALS				10	52	25	12	71	21		5	1	7	51	39	4	12	18	1	7	5	341

TABLE B.2 (Continued)

DISTRIBUTION OF SEWERS SAMPLE BY PIPE TYPE AND DEPTH

(DIAMETER: 20")

	PVC			AC			VC			CI			RCP			DIP			OTHER			
	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	TOTALS
REGION 01																	3					3
CONNECTICUT																	3					3
REGION 02					6	5																11
NEW JERSEY					3	5																8
NEW YORK					3																	3
REGION 03																1	1					2
VIRGINIA																1	1					2
REGION 05																		1				1
INDIANA																		1				1
REGION 06										1	3											4
TEXAS										1	3											4
NATIONAL TOTALS					6	5				1	3					1	4	1				21

TABLE B.2 (Continued)

DISTRIBUTION OF SEWERS SAMPLE
BY PIPE TYPE AND DEPTH

(DIAMETER: 21")

	PVC			AC			VC			CI			RCP			DIP			OTHER			TOTALS
	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	
REGION 01														3	2							5
CONNECTICUT														2								2
MAINE														1	2							3
REGION 02				2	12	4		2	3				3	15	3							44
NEW JERSEY				2	8	4							3	15	3							35
NEW YORK					4			2	3													9
REGION 03				1	4	6	1	6	6					1	2							27
DELAWARE									3													3
PENNSYLVANIA				1	4	6		2	1					1	2							17
VIRGINIA							1	4	2													7
REGION 04													1	4	1							6
GEORGIA													1	4	1							6
REGION 05								2					2	27	36					4	1	72
ILLINOIS								1					1	10	4							16
INDIANA								1												2		3
MICHIGAN														1								1
MINNESOTA														9	25							34
OHIO													1	7	7					2	1	18
REGION 06							2	9	8													19
NEW MEXICO								2	6													8
TEXAS							2	7	2													11
REGION 08		2	1																			3
COLORADO		2	1																			3
NATIONAL TOTALS		2	1	3	16	10	3	19	17				6	50	44					4	1	176

TABLE B.2 (Continued)

DISTRIBUTION OF SEWERS SAMPLE
BY PIPE TYPE AND DEPTH

(DIAMETER: 24")

	PVC			AC			VC			CI			RCP			DIP			OTHER			TOTALS
	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	
REGION 01														5	5							10
CONNECTICUT														2	1							3
MAINE														1	1							2
NEW HAMPSHIRE														2	3							5
REGION 02				1	20	7				1				15	14		2		1	2		63
NEW JERSEY				1	9	4								13	13							40
NEW YORK					11	3				1							2					17
VIRGIN ISLANDS														2	1				1	2		6
REGION 03					4		1	7	2				2	16	11							43
DELAWARE								4	2													6
PENNSYLVANIA					4								1	12	10							27
VIRGINIA							1	3					1	4	1							10
REGION 04						6	3	11	3				5	24	16	2	12	12				94
FLORIDA							1	3	1													5
GEORGIA							1							4	2							7
MISSISSIPPI						6											4	9				19
NORTH CAROLINA								4	1				4	16	12		4	3				44
SOUTH CAROLINA							1	4	1							1	4					11
TENNESSEE													1	4	2	1						8
REGION 05				1	3			7	4				1	34	42		5	1	1	9	12	120
ILLINOIS				1	3			3	2				1	10	4							24
INDIANA								3	1											2	3	9
MICHIGAN														16	19				1	1		37
MINNESOTA														2	6		1	1				10
OHIO								1	1					6	13		4			6	9	40
REGION 06							1	11	8	1	5					1						27
TEXAS							1	11	8	1	5					1						27
REGION 08		3																				3
COLORADO		3																				3
NATIONAL TOTALS		3		2	27	13	5	36	17	2	5		8	94	88	3	19	13	2	11	12	360

TABLE B.2 (Continued)

DISTRIBUTION OF SEWERS SAMPLE
BY PIPE TYPE AND DEPTH

(DIAMETER: 27")

	PVC			AC			VC			CI			RCP			DIP			OTHER			TOTALS
	DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			
	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	
REGION 02													1	9	4							14
NEW JERSEY													1	5								6
NEW YORK														4	4							8
REGION 04														1	2							3
MISSISSIPPI														1	2							3
REGION 05													1	10	24					2	5	42
ILLINOIS														3	6							9
MICHIGAN																					1	1
OHIO													1	7	18					2	4	32
REGION 06							1	4	6													11
TEXAS							1	4	6													11
NATIONAL TOTALS							1	4	6				2	20	30					2	5	70

TABLE B.2 (Continued)

DISTRIBUTION OF SEWERS SAMPLE BY PIPE TYPE AND DEPTH

(DIAMETER: 30")

	PVC			AC			VC			CI			RCP			DIP			OTHER			
	DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			
	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	TOTALS
REGION 01														7	4		1					12
MAINE														2	4		1					7
MASSACHUSETTS														5								5
REGION 02					2								3	38	29					1	1	74
NEW JERSEY					2								2	30	23							57
NEW YORK													1	8	3							12
VIRGIN ISLANDS															3					1	1	5
REGION 03													1	4	9							14
PENNSYLVANIA													1	4	9							14
REGION 04													3	16	28	2	8	3		2		62
MISSISSIPPI															5							5
NORTH CAROLINA													2	8	14	1	4	1				30
SOUTH CAROLINA													1	8	9	1	4	2		2		27
REGION 05								2	4				1	17	34			2		2		62
ILLINOIS													1	12	12							25
INDIANA														1								1
MICHIGAN														1								1
MINNESOTA														2	10			2				14
OHIO								2	4					1	12					2		21
NATIONAL TOTALS					2			2	4				8	82	104	2	9	5		5	1	224

(DIAMETER: 33")

	PVC			AC			VC			CI			RCP			DIP			OTHER			
	DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			
	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	TOTALS
REGION 02														12	3							15
NEW JERSEY														8	3							11
NEW YORK														4								4
REGION 05														1	2							3
ILLINOIS														1	2							3
NATIONAL TOTALS														13	5							18

TABLE B.2 (Continued)

DISTRIBUTION OF SEWERS SAMPLE BY PIPE TYPE AND DEPTH

(DIAMETER: 36")

	PVC			AC			VC			CI			RCP			DIP			OTHER			
	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	DEPTH (FT) <8	8-15	>15	TOTALS
REGION 01														3	5							8
MAINE														2	2							4
MASSACHUSETTS														1	3							4
REGION 02													3	45	49							97
NEW JERSEY													3	37	43							83
NEW YORK														8	6							14
REGION 03													1	4	5							10
PENNSYLVANIA															1							1
VIRGINIA													1	4	4							9
REGION 04													1	17	27	1	4	1				51
FLORIDA													1	4	2							7
MISSISSIPPI															3							3
NORTH CAROLINA																1	4	1				6
SOUTH CAROLINA														13	22							35
REGION 05								1	9				1	19	11					6	8	55
ILLINOIS													1	17	11							29
MICHIGAN														2								2
OHIO								1	9											6	8	24
NATIONAL TOTALS								1	9				6	88	97	1	4	1		6	8	221

TABLE B.2 (Continued)

DISTRIBUTION OF SEWERS SAMPLE
BY PIPE TYPE AND DEPTH

(DIAMETER: 42")

	PVC			AC			VC			CI			RCP			DIP			OTHER			TOTALS
	DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			
	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	3-15	>15	
REGION 02														5	16							21
NEW JERSEY														5	16							21
REGION 04														11	14	1	4	4				34
FLORIDA															2							2
NORTH CAROLINA														8	5	1	4	4				22
SOUTH CAROLINA														3	7							10
REGION 05														12	16					3	3	34
ILLINOIS														12	10							22
OHIO															6					3	3	12
NATIONAL TOTALS														28	46	1	4	4		3	3	89

(DIAMETER: 46")

	PVC			AC			VC			CI			RCP			DIP			OTHER			TOTALS
	DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			
	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	
REGION 02														1								1
NEW JERSEY														1								1
NATIONAL TOTALS														1								1

TABLE B.2 (Continued)

DISTRIBUTION OF SEWERS SAMPLE BY PIPE TYPE AND DEPTH

(DIAMETER: 48")

	PVC			AC			VC			CI			RCP			DIP			OTHER			TOTALS
	DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			
	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	
REGION 01														1	4							5
MAINE														1	4							5
REGION 02														7	14							21
NEW JERSEY														7	14							21
REGION 04													1	4	5							10
NORTH CAROLINA													1	4	5							10
NATIONAL TOTALS													1	12	23							36

DISTRIBUTION OF SEWERS SAMPLE BY PIPE TYPE AND DEPTH

(DIAMETER: 54")

	PVC			AC			VC			CI			RCP			DIP			OTHER			TOTALS
	DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			
	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	
REGION 02														1	2							3
NEW JERSEY														1	2							3
REGION 04														9	27							36
SOUTH CAROLINA														9	27							36
REGION 05																						
ILLINOIS														4							1	5
OHIO														4								4
																					1	1
NATIONAL TOTALS														14	29						1	44

TABLE B.2 (Continued)

DISTRIBUTION OF SEWERS SAMPLE BY PIPE TYPE AND DEPTH

(DIAMETER: 60")

	PVC			AC			VC			CI			RCP			DIP			OTHER			TOTALS
	DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			
	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	J-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	
REGION 02														16	23							39
NEW JERSEY														16	23							39
REGION 04														1	11					3	9	24
SOUTH CAROLINA														1	11					3	9	24
REGION 05														2	16							18
OHIO														2	16							18
NATIONAL TOTALS														19	50					3	9	81

TABLE B.2 (Continued)

DISTRIBUTION OF SEWERS SAMPLE
BY PIPE TYPE AND DEPTH

(DIAMETER: 66")

	PVC			AC			VC			CI			RCP			DIP			OTHER			TOTALS
	DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			
	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	
REGION 02															7							7
NEW JERSEY															7							7
REGION 05														1	5							6
OHIO														1	5							6
NATIONAL TOTALS														1	12							13

(DIAMETER: 72")

	PVC			AC			VC			CI			RCP			DIP			OTHER			TOTALS
	DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			DEPTH (FT)			
	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	<8	8-15	>15	
REGION 02														5	23							28
NEW JERSEY														5	23							28
NATIONAL TOTALS														5	23							28

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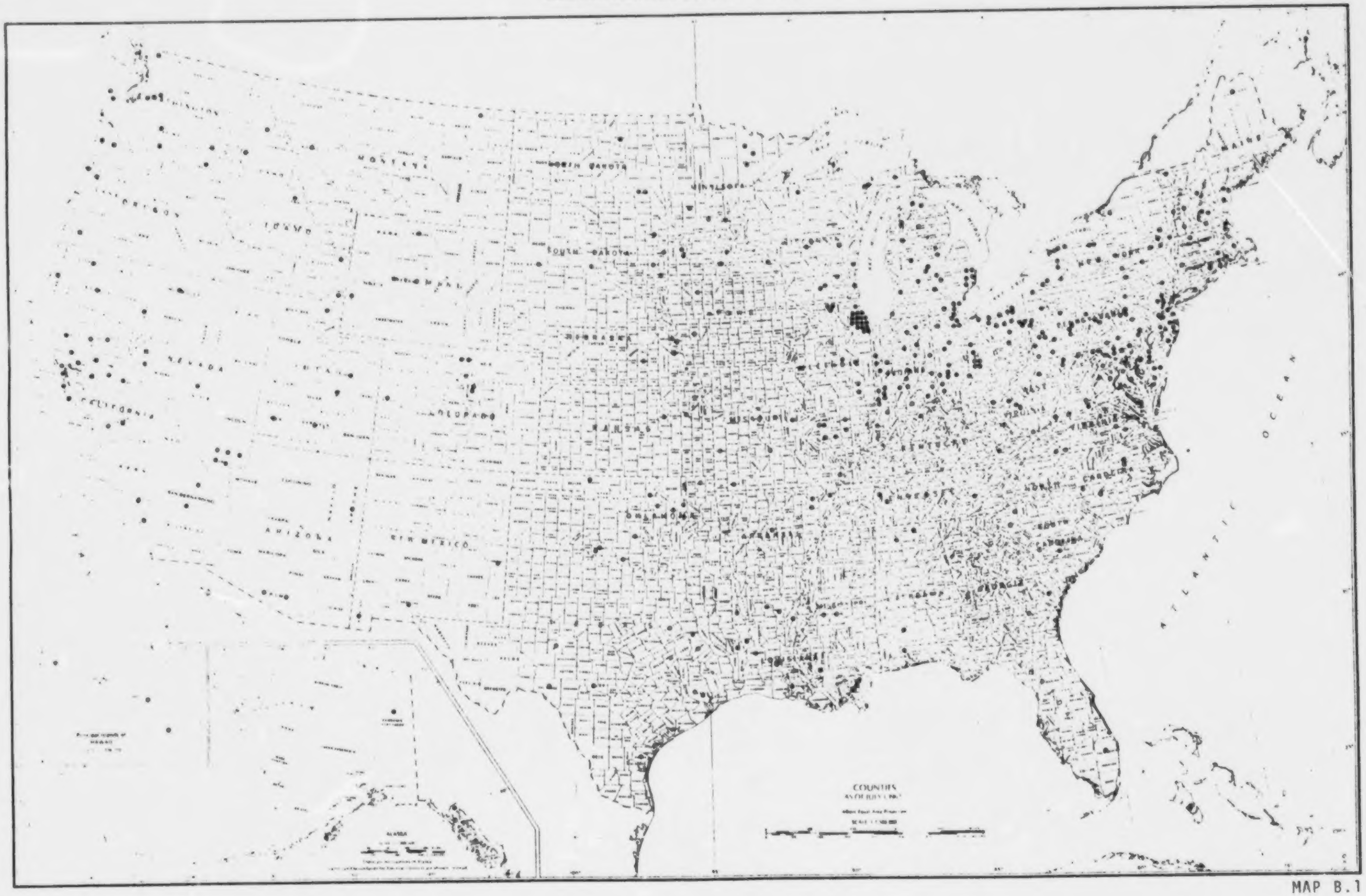
E.P.A. MUNICIPAL CONSTRUCTION COST STUDY

SAMPLED SANITARY SEWER FACILITIES


MONTANA
NORTH DAKOTA
MINNESOTA
OREGON
IDAHO
SOUTH DAKOTA
WYOMING
NEBRASKA
NEVADA
UTAH
COLORADO
CALIFORNIA
KANSAS
MISSOURI
KENTUCKY
ARIZONA
NEW MEXICO
OKLAHOMA
ARKANSAS
TENNESSEE
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
ALABAMA
WEST VIRGINIA
VIRGINIA
NEW YORK
MAINE
ATLANTIC OCEAN
COUNTIES
ALASKA

MAP B.1

APPENDIX C

COST INDEXING

C.1 REQUIREMENTS

Construction bid data employed in developing cost relationships presented in this report originated across a wide spectrum of time and location. Bid dates ranged from second quarter 1973 to second quarter 1977 and locations varied from Alaska to Puerto Rico. Data included Step I and Step II grant costs, non-construction item costs for administrative, legal and contingency expenses, and lump-sum costs for conveyance system facilities. Because of these variations it was necessary to devise a system for referencing costs to a common dollar base for the purposes of data analysis.

For the purposes of this study several indexing tools were considered. Criteria for selection of the most appropriate method included the following:

1. National Scope - The data base included facilities nationwide; therefore the indexing method had to apply to all geographical areas of the country.

2. Sufficient Time Span - Bids to be updated were, in some cases, four years old. The indices must be applicable to each quarter from 1973 to the present.

3. Sewer Construction Oriented - The mix of material and labor components had to reflect that typical of wastewater conveyance facilities.

4. Commonly Accepted and Available - Due to the possibility of future use of this study as well as its potential for updating, the indexing method had to be available to and accepted by the user community.

C.2 COST INDEXING SYSTEMS INVESTIGATED

There are a number of cost indexing systems in existence, each directed at the needs of a specific user. Some, such as the Consumer Price Index, are general in nature and applicable to a variety of products and services. Others, like the Federal Highway Index, serve specific estimating needs. Generally, input to the development of each index consists of a mix of material and labor costs. The composition of this mix determines the relevance of a given index to a particular construction estimating requirement.

Using the criteria above, several cost indexing methods were investigated for use in this study, including the Engineering News Record (ENR) Building Cost Index, the ENR Construction Cost Index, the Bureau of Reclamation Index, the EPA Complete Urban Sewer System (CUSS) Index, and two contractor cost indices. Based on this investigation, the EPA CUSS Index was chosen as most representative of sanitary sewer construction cost trends.

The EPA CUSS Index is updated quarterly and published in the Engineering News Record periodically. Table C.1 is a tabulation of the CUSS index from its origination to third quarter, 1977. Values listed in these tables are final values and may in some cases vary slightly from preliminary calculations published in the Engineering News Record.

C.3 ALASKA, HAWAII, GUAM, PUERTO RIC INDICES

Because construction bid information was collected for facilities in Alaska, Hawaii, Puerto Rico, and Guam, indices were required to update those costs. The indices listed in Table C.1 for facilities in these states of territories were developed using the following procedure:

1. From the data bank of the 1976 Needs Survey, including over 23,000 conveyance facilities, multipliers were developed for Alaska, Hawaii, Guam, and Puerto Rico for newly constructed facilities. These multipliers are a ratio of the average cost of construction in the particular state to the national average cost of construction for similar facilities. Only costs based on engineers' estimates and cost of previous comparable construction were used for this analysis.

2. The 25 city index average for each quarter was then multiplied by the appropriate Alaska, Hawaii, Guam, or Puerto Rico multiplier, yielding a quarterly index for these four areas.

C.4 USE OF THE EPA CUSS INDEX

C.4.1 City Influence Boundaries

Applying the appropriate quarterly index to a construction bid required the determination of which EPA index city most influenced the contract prices. The areas of influence designated by Map C.1 are the result of application of the following criteria:

1. County boundaries were followed without exception.
2. State boundaries were followed where more definitive information was unavailable.
3. Bureau of Labor Statistics Information was used to draw boundaries where such information was available.

Due to the fact that labor is generally the largest single cost component for a sanitary sewer facility, an effort was made to define boundaries on Map C.1 based on Department of Labor, Bureau of Labor Statistics data. The Bureau regularly collects and tabulates wage rates for a variety of construction skills for 102 cities nationwide. From these tabulations a combined rate for carpenters, masons and building laborers was derived for 15 quarters dating from third quarter 1973 to first quarter 1977. These three skills were chosen because they correspond to the labor skills that comprise the labor component of the EPA index. Next, the 15 quarters of record for each of the 102 BLS cities were statistically correlated to the labor component history of each of the EPA index cities yielding a correlation coefficient representing the similarity of that city's labor costs to each EPA city. These correlations were then used to define areas of influence for CUSS index cities. For example, the correlations of the BLS cities, Chattanooga, Nashville and Knoxville with the CUSS city of Birmingham were all much higher than their correlations with the CUSS city of Cincinnati. Therefore, Birmingham's influence boundary was drawn to include Tennessee. Similarly, the wage rate histories of the Atlanta and Miami Standard Metropolitan Statistical Areas (SMSA) were so radically different than those of the closest BLS city histories that the areas of influence for those two cities include only the respective SMSA's.

C.5 COMMON-BASE COST CONVERSIONS

Using Map C.1 along with Table C.1, construction bid data for a given location and date may be converted to a common dollar base for development of a national average cost relationship. An example of this might be a bid cost of X dollars in January, 1975 for a conveyance system in Cheyenne, Wyoming. The influence city is found from Map C.1 to be Denver, Colorado. From Table C.1 the first quarter 1975 index for Denver is 87. To convert the cost to third quarter 1977 dollars, X should be multiplied by 115/87 or 1.32. Conversely, cost values taken from national average cost curves must be multiplied by the ratio of the index for the appropriate city and the national average index for the same quarter to arrive at a cost estimate based on the economy of the specific city.

TABLE C.1

EPA COMPLETE URBAN SEWER SYSTEM (CUSS) INDEX

		1973		1974				1975				1976				1977		
NO.	CITY NAME	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3
1	Atlanta	80	81	82	85	86	85	88	92	93	92	96	102	103	102	110	111	112
2	Baltimore	98	98	98	100	118	118	119	115	115	124	129	137	137	138	138	138	140
3	Birmingham	74	78	79	81	81	83	88	90	93	93	94	97	97	97	96	102	105
4	Boston	111	115	115	118	132	134	140	145	145	145	150	149	150	151	152	153	162
5	Charlotte	54	54	54	56	56	55	55	60	69	68	67	70	74	76	75	77	77
6	Chicago	112	114	117	124	123	122	138	140	140	141	144	148	153	153	154	158	164
7	Cincinnati	107	109	109	118	121	122	125	128	131	132	135	139	139	139	143	144	153
8	Cleveland	108	116	117	122	122	121	137	141	142	142	145	145	149	149	154	158	164
9	Dallas	72	69	70	79	79	79	84	85	86	86	90	96	96	97	97	103	104
10	Denver	77	79	79	86	87	86	87	88	92	96	96	99	99	105	110	115	115
11	Detroit	114	114	114	124	127	125	128	131	132	132	140	140	141	140	151	158	159
12	Houston	72	69	70	77	77	82	90	92	94	94	97	104	104	104	107	113	117
13	Kansas City	100	101	101	108	113	115	119	125	128	128	128	133	135	135	135	136	144
14	Los Angeles	117	113	114	116	115	122	124	125	130	141	139	137	146	155	159	159	166
15	Miami	89	90	90	92	92	96	97	102	102	101	106	112	112	111	116	117	120
16	Milwaukee	102	106	109	113	113	117	121	127	127	129	130	130	133	133	136	140	146
17	Minneapolis	94	94	95	103	100	99	112	112	112	114	120	122	125	126	130	133	135
18	New Orleans	89	93	93	100	101	100	103	112	116	116	118	122	122	127	134	135	142
19	New York	142	142	144	144	148	150	155	155	164	168	168	169	171	171	172	173	182
20	Philadelphia	123	125	125	144	147	142	146	144	158	148	152	157	158	158	162	168	167
21	Pittsburg	110	115	118	123	125	126	130	133	133	133	135	135	135	136	147	148	154
22	St. Louis	126	124	126	127	149	145	146	147	153	153	156	164	164	164	165	166	171
23	San Francisco	108	109	112	112	113	119	127	134	135	135	138	146	149	149	151	151	160
24	Seattle	103	104	105	108	108	112	118	122	133	133	135	149	150	149	146	150	158
25	Trenton	120	120	120	133	136	134	137	135	135	136	145	144	147	147	147	150	152
	25 City Average	101	102	103	108	111	112	117	120	122	124	126	130	132	133	136	139	143
26	Alaska	268	271	271	289	297	299	312	319	326	330	338	348	352	355	363	370	382
27	Hawaii	129	130	132	139	143	144	150	154	157	159	163	167	170	171	174	177	183
28	Guam	125	127	128	135	139	140	146	149	153	154	158	162	165	166	169	172	177
29	Puerto Rico	63	64	65	68	70	71	73	75	77	78	80	82	83	84	86	88	91

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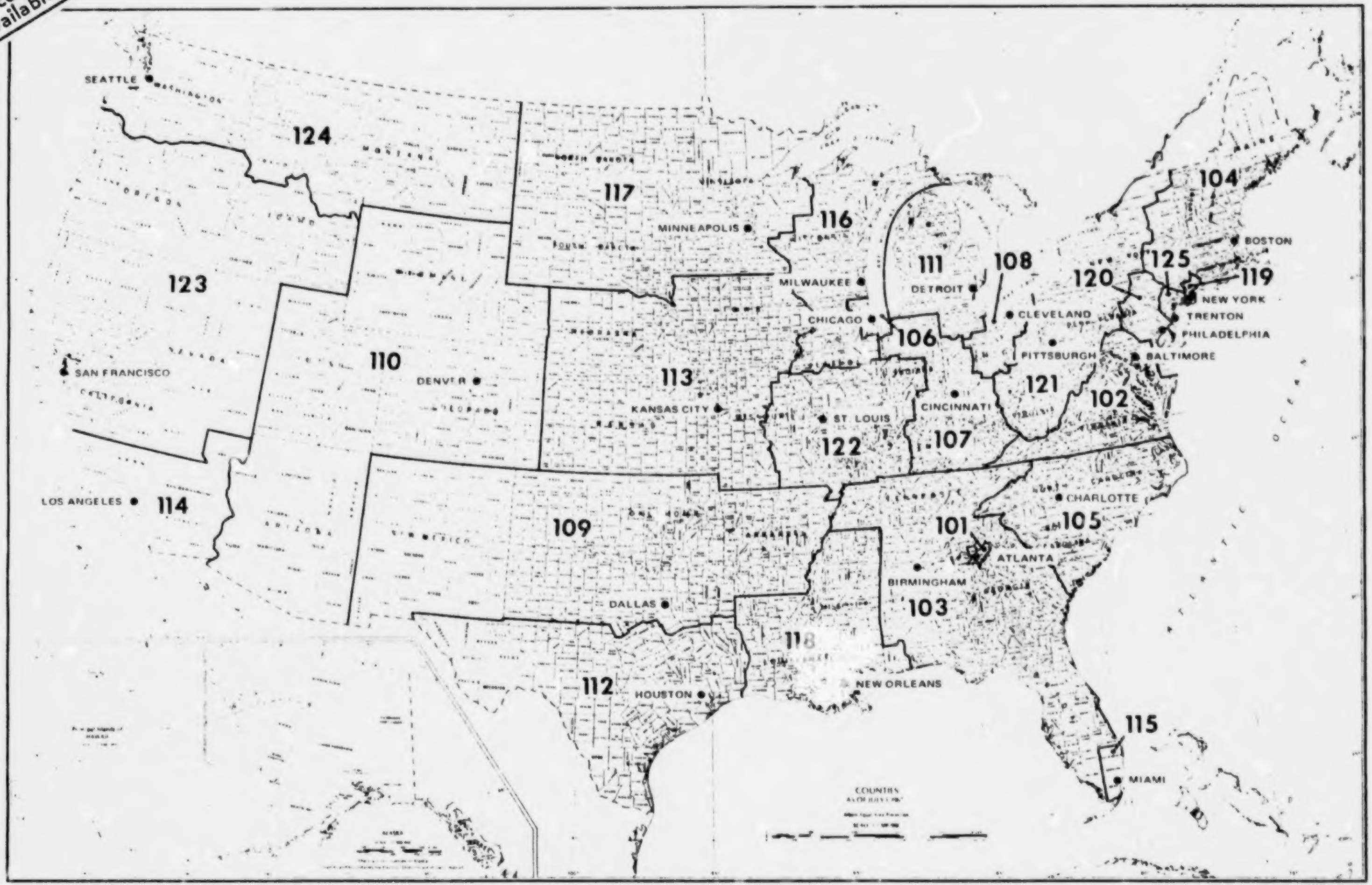
E.P.A. MUNICIPAL CONSTRUCTION COST INDEX MAP

SANITARY SEWER FACILITIES - CITY MULTIPLIERS


SEATTLE
124
117
116
111
108
104
BOSTON
125
119
NEW YORK
TRENTON
PHILADELPHIA
BALTIMORE
120
MINNEAPOLIS
MILWAUKEE
DETROIT
CHICAGO
106
CLEVELAND
PITTSBURGH
121
102
123
SAN FRANCISCO
110
DENVER
113
KANSAS CITY
ST LOUIS
122
CINCINNATI
107
LOS ANGELES
114
109
101
CHARLOTTE
105
ATLANTA
BIRMINGHAM
103
DALLAS
118
NEW ORLEANS
112
HOUSTON
115
MIAMI
COUNTIES
ATLANTIC OCEAN

MAP C.1

APPENDIX D

SANITARY SEWER COST TABLES

TABLE D.1

SANITARY SEWERS
AVERAGE TOTAL COST PER FOOT OF PIPE

DIAM	REG 01	REG 02	REG 03	REG 04	REG 05	REG 06	REG 07	REG 08	REG 09	REG 10	NATIONAL
04	$ 13.81 N= 2	$ .00 N= 0	$ 10.72 N= 24	$ 4.51 N= 1	$ 15.34 N= 22	$ 12.51 N= 24	$ 5.52 N= 1	$ 6.87 N= 5	$ 11.39 N= 22	$ 12.34 N= 16	$ 12.09 N= 117
06	$ 28.99 N= 21	$ 21.30 N= 2	$ 26.35 N= 58	$ 9.10 N= 2	$ 24.29 N= 155	$ 16.83 N= 39	$ 16.41 N= 3	$ 13.42 N= 9	$ 18.53 N= 28	$ 30.43 N= 15	$ 23.39 N= 332
08	$ 44.46 N= 87	$ 43.66 N= 162	$ 32.76 N= 316	$ 19.71 N= 67	$ 34.41 N= 471	$ 22.51 N= 189	$ 18.44 N= 9	$ 18.97 N= 57	$ 27.02 N= 29	$ 39.25 N= 49	$ 32.75 N=1436
10	$ 81.30 N= 54	$ 55.41 N= 71	$ 44.03 N= 171	$ 26.02 N= 110	$ 38.22 N= 330	$ 28.28 N= 103	$ 26.73 N= 3	$ 24.20 N= 14	$ 40.87 N= 20	$ 24.84 N= 11	$ 40.30 N= 887
12	$ 63.49 N= 56	$ 77.40 N= 87	$ 43.90 N= 113	$ 35.13 N= 57	$ 48.46 N= 319	$ 41.51 N= 140	$ 31.17 N= 4	$ 32.07 N= 19	$ 47.54 N= 18	$ 60.12 N= 12	$ 49.50 N= 825
15	$ 100.00 N= 29	$ 120.65 N= 23	$ 64.78 N= 80	$ 44.97 N= 42	$ 53.10 N= 182	$ 37.00 N= 53	$ 68.88 N= 1	$ 38.13 N= 11	$ 51.26 N= 10	$ 115.43 N= 5	$ 59.52 N= 436
16	$ 110.13 N= 12	$ 81.76 N= 42	$ 63.77 N= 9	$ 53.08 N= 15	$ 80.01 N= 13	$ .00 N= 0	$ .00 N= 0	$ 46.18 N= 2	$ 57.25 N= 1	$ 102.71 N= 7	$ 79.55 N= 101
18	$ 133.73 N= 25	$ 120.21 N= 56	$ 70.71 N= 89	$ 46.76 N= 60	$ 86.53 N= 184	$ 59.70 N= 89	$ 41.79 N= 4	$ 47.78 N= 6	$ 89.24 N= 13	$ 124.28 N= 7	$ 80.47 N= 533
21	$ 158.59 N= 6	$ 141.90 N= 46	$ 89.68 N= 37	$ 36.34 N= 6	$ 75.56 N= 106	$ 57.51 N= 20	$ 43.29 N= 1	$ 58.82 N= 3	$ 64.90 N= 13	$ .00 N= 0	$ 89.23 N= 238
24	$ 201.03 N= 16	$ 143.79 N= 73	$ 106.63 N= 59	$ 88.25 N= 98	$ 86.97 N= 167	$ 100.99 N= 42	$ 57.10 N= 3	$ 60.41 N= 8	$ 104.43 N= 10	$ 154.94 N= 9	$ 104.15 N= 485
27	$ .00 N= 0	$ 119.15 N= 26	$ 185.20 N= 8	$ 96.30 N= 4	$ 121.26 N= 70	$ 77.10 N= 11	$ .00 N= 0	$ .00 N= 0	$ 93.10 N= 12	$ .00 N= 0	$ 117.69 N= 131
30	$ 181.26 N= 17	$ 186.55 N= 85	$ 201.70 N= 16	$ 104.03 N= 66	$ 116.58 N= 125	$ 131.63 N= 11	$ 71.99 N= 1	$ 105.52 N= 3	$ 104.39 N= 9	$ 279.15 N= 5	$ 141.35 N= 338
36	$ 230.72 N= 15	$ 217.72 N= 115	$ 219.56 N= 19	$ 178.60 N= 54	$ 160.55 N= 107	$ 127.46 N= 1	$ .00 N= 0	$ 91.63 N= 1	$ 109.55 N= 9	$ 220.63 N= 1	$ 189.19 N= 322
42	$ 265.07 N= 2	$ 270.64 N= 21	$ 292.35 N= 5	$ 242.07 N= 34	$ 249.04 N= 75	$ .00 N= 0	$ .00 N= 0	$ 107.07 N= 3	$ 245.58 N= 14	$ 253.34 N= 1	$ 249.01 N= 155
48	$ 449.96 N= 7	$ 266.93 N= 21	$ 164.47 N= 5	$ 197.66 N= 10	$ 269.35 N= 44	$ .00 N= 0	$ .00 N= 0	$ 519.96 N= 2	$ 232.94 N= 14	$ 266.78 N= 1	$ 268.98 N= 104
54	$ .00 N= 0	$ 366.01 N= 8	$ .00 N= 0	$ 268.71 N= 36	$ 216.14 N= 20	$ .00 N= 0	$ .00 N= 0	$ 282.98 N= 1	$ 235.96 N= 1	$ .00 N= 0	$ 264.29 N= 66
60	$ 498.17 N= 1	$ 377.35 N= 43	$ .00 N= 0	$ 286.09 N= 24	$ 449.57 N= 37	$ .00 N= 0	$ .00 N= 0	$ 326.62 N= 6	$ 289.57 N= 2	$ .00 N= 0	$ 378.44 N= 113
66	$ .00 N= 0	$ 490.56 N= 10	$ .00 N= 0	$ .00 N= 0	$ 338.99 N= 21	$ .00 N= 0	$ .00 N= 0	$ 360.73 N= 10	$ 307.58 N= 2	$ .00 N= 0	$ 377.83 N= 43

TABLE D.1 (Continued)

72	$ .00 N= 0	$ 517.96 N= 21	$ 277.59 N= 9	$ .00 N= 0	$ 310.27 N= 19	$ .00 N= 0	$ .00 N= 0	$ 460.02 N= 22	$ 319.46 N= 2	$ .00 N= 0	$ 411.37 N= 73
78	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 393.59 N= 4	$ .00 N= 0	$ .00 N= 0	$ 519.20 N= 26	$ 341.19 N= 5	$ .00 N= 0	$ 479.42 N= 35
84	$ .00 N= 0	$1254.55 N= 2	$ .00 N= 0	$ .00 N= 0	$ 528.75 N= 11	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 340.54 N= 1	$ .00 N= 0	$ 618.99 N= 14
90	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 620.27 N= 4	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 620.27 N= 4
96	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 863.04 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 465.56 N= 1	$ .00 N= 0	$ 730.55 N= 3

TABLE D.1 SUMMARY

SANITARY SEWERS
AVERAGE COST PER FOOT OF PIPE (NATIONAL)

DIAM	UNIT COST	APPURT ($/FT)	NON-CONS ($/FT)	TOTAL COST ($/FT)	
04	$ 9.78	$ 1.29	$ 1.02	$ 12.09	(N= 117)
06	$ 14.53	$ 5.01	$ 3.83	$ 23.38	(N= 332)
08	$ 20.85	$ 6.26	$ 5.62	$ 32.75	(N= 1436)
10	$ 24.20	$ 8.81	$ 7.28	$ 40.30	(N= 887)
12	$ 28.36	$ 11.97	$ 9.15	$ 49.49	(N= 825)
15	$ 32.70	$ 16.04	$ 10.76	$ 59.52	(N= 436)
16	$ 43.96	$ 16.70	$ 18.88	$ 79.55	(N= 101)
18	$ 39.67	$ 23.22	$ 17.57	$ 80.47	(N= 533)
21	$ 43.28	$ 23.14	$ 22.80	$ 89.23	(N= 238)
24	$ 51.13	$ 29.79	$ 23.21	$ 104.15	(N= 485)
27	$ 62.58	$ 33.05	$ 22.06	$ 117.69	(N= 131)
30	$ 70.20	$ 37.22	$ 33.92	$ 141.35	(N= 338)
36	$ 91.71	$ 57.19	$ 40.28	$ 189.19	(N= 322)
42	$ 141.58	$ 65.53	$ 41.88	$ 249.01	(N= 155)
48	$ 144.03	$ 70.52	$ 54.41	$ 268.98	(N= 104)
54	$ 148.67	$ 62.24	$ 53.38	$ 264.29	(N= 66)
60	$ 190.11	$ 122.36	$ 65.95	$ 378.44	(N= 113)
66	$ 235.15	$ 82.12	$ 60.55	$ 377.83	(N= 43)
72	$ 241.71	$ 100.99	$ 68.65	$ 411.37	(N= 73)
78	$ 294.82	$ 110.24	$ 74.34	$ 479.42	(N= 35)
84	$ 437.68	$ 90.25	$ 91.05	$ 618.99	(N= 14)
90	$ 372.49	$ 126.74	$ 121.03	$ 620.27	(N= 4)
96	$ 563.03	$ 63.43	$ 104.08	$ 730.55	(N= 3)

TABLE D.2-A

SANITARY SEWERS
AVERAGE TOTAL COST PER FOOT OF PIPE

(PVC PIPE)

DIAM	REG 01	REG 02	REG 03	REG 04	REG 05	REG 06	REG 07	REG 08	REG 09	REG 10	NATIONAL
04	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 4.51 N= 1	$ 23.02 N= 1	$ 17.38 N= 11	$ 5.52 N= 1	$ 7.57 N= 3	$ .00 N= 0	$ .00 N= 0	$ 14.53 N= 17
06	$ .00 N= 0	$ .00 N= 0	$ 20.31 N= 1	$ 9.10 N= 1	$ 18.03 N= 14	$ 20.86 N= 1	$ 8.98 N= 1	$ 11.15 N= 7	$ .00 N= 0	$ .00 N= 0	$ 15.59 N= 25
08	$ 25.58 N= 1	$ .00 N= 0	$ 29.14 N= 24	$ 14.87 N= 2	$ 103.57 N= 35	$ 15.19 N= 4	$ 8.53 N= 1	$ 19.40 N= 21	$ 35.15 N= 1	$ 34.54 N= 2	$ 54.51 N= 91
10	$ .00 N= 0	$ .00 N= 0	$ 44.87 N= 10	$ 22.53 N= 31	$ 59.94 N= 17	$ .00 N= 0	$ 10.75 N= 1	$ 25.21 N= 4	$ .00 N= 0	$ 36.52 N= 1	$ 36.16 N= 64
12	$ 49.76 N= 1	$ .00 N= 0	$ 63.32 N= 3	$ 22.58 N= 10	$ 112.07 N= 14	$ 43.58 N= 8	$ 13.25 N= 1	$ 32.51 N= 4	$ .00 N= 0	$ 44.00 N= 1	$ 61.20 N= 42
15	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 30.18 N= 9	$ 50.72 N= 5	$ .00 N= 0	$ .00 N= 0	$ 52.45 N= 3	$ .00 N= 0	$ .00 N= 0	$ 40.15 N= 17
18	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 41.73 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 41.73 N= 1

TABLE D.2-A SUMMARY

SANITARY SEWERS
AVERAGE COST PER FOOT OF PIPE (NATIONAL)

(PVC PIPE)

DIAM	UNIT COST	APPURT ($/FT)	NON-CONS ($/FT)	TOTAL COST ($/FT)	
04	$ 12.70	$ .98	$ .83	$ 14.53	(N= 17)
06	$ 10.78	$ 2.70	$ 2.10	$ 15.59	(N= 25)
08	$ 20.36	$ 22.85	$ 11.29	$ 54.51	(N= 91)
10	$ 18.20	$ 11.58	$ 6.37	$ 36.16	(N= 64)
12	$ 20.49	$ 20.43	$ 20.26	$ 61.20	(N= 42)
15	$ 19.96	$ 10.54	$ 9.63	$ 40.15	(N= 17)
18	$ 12.94	$ 20.92	$ 7.85	$ 41.73	(N= 1)

TABLE D.2-B

SANITARY SEWERS
AVERAGE TOTAL COST PER FOOT OF PIPE

(ASBESTOS CEMENT PIPE)

DIAM	REG 01	REG 02	REG 03	REG 04	REG 05	REG 06	REG 07	REG 08	REG 09	REG 10	NATIONAL
04	$ 12.11 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 8.31 N= 4	$ 9.07 N= 5
06	$ 28.87 N= 3	$ .00 N= 0	$ 18.03 N= 4	$ .00 N= 0	$ 20.82 N= 4	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 22.00 N= 11
08	$ 34.67 N= 15	$ 39.35 N= 80	$ 27.95 N= 76	$ 8.51 N= 4	$ 54.38 N= 21	$ .00 N= 0	$ .00 N= 0	$ 25.57 N= 1	$ [illegible].99 N= 3	$ 9.81 N= 3	$ 34.85 N= 203
10	$ 82.59 N= 5	$ 59.97 N= 48	$ 37.39 N= 58	$ 29.20 N= 26	$ 28.66 N= 22	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 15.82 N= 3	$ 42.57 N= 162
12	$ 45.90 N= 8	$ 82.98 N= 44	$ 40.62 N= 45	$ 41.31 N= 25	$ 37.17 N= 6	$ .00 N= 0	$ .00 N= 0	$ 47.89 N= 1	$ 33.07 N= 2	$ 18.87 N= 2	$ 54.54 N= 133
15	$ .00 N= 0	$ 160.64 N= 12	$ 51.14 N= 34	$ 71.39 N= 14	$ 55.75 N= 3	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 76.72 N= 63
16	$ 107.98 N= 6	$ 93.17 N= 12	$ 48.57 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 99.20 N= 5	$ 96.27 N= 24
18	$ 122.27 N= 6	$ 94.01 N= 23	$ 63.46 N= 46	$ 32.14 N= 5	$ 33.55 N= 3	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 134.27 N= 3	$ 75.34 N= 86
21	$ .00 N= 0	$ 129.14 N= 18	$ 86.46 N= 11	$ .00 N= 0	$ 94.53 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 112.34 N= 30
24	$ .00 N= 0	$ 120.11 N= 28	$ 57.58 N= 4	$ 158.56 N= 6	$ 49.48 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 116.09 N= 40
30	$ .00 N= 0	$ 256.37 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 256.37 N= 2

TABLE D.2-B SUMMARY

SANITARY SEWERS
AVERAGE COST PER FOOT OF PIPE (NATIONAL)

(ASBESTOS CEMENT PIPE)

DIAM	UNIT COST	APPURT ($/FT)	NON-CONS ($/FT)	TOTAL COST ($/FT)
04	$ 7.77	$ .85	$ .44	$ 9.07 (N= 5)
06	$ 14.20	$ 4.92	$ 2.87	$ 22.00 (N= 11)
08	$ 20.89	$ 6.28	$ 7.66	$ 34.85 (N= 203)
10	$ 25.82	$ 10.07	$ 6.67	$ 42.57 (N= 162)
12	$ 28.74	$ 15.86	$ 9.93	$ 54.54 (N= 133)
15	$ 40.90	$ 25.08	$ 10.72	$ 76.72 (N= 63)
16	$ 47.13	$ 19.96	$ 29.17	$ 96.27 (N= 24)
18	$ 32.70	$ 20.98	$ 21.65	$ 75.34 (N= 86)
21	$ 40.64	$ 22.46	$ 49.23	$ 112.34 (N= 30)
24	$ 45.67	$ 29.70	$ 40.70	$ 116.09 (N= 40)
30	$ 45.12	$ 57.68	$ 153.55	$ 256.37 (N= 2)

TABLE D.2-C

SANITARY SEWERS
AVERAGE TOTAL COST PER FOOT OF PIPE

(VITRIFIED CLAY PIPE)

DIAM	REG 01	REG 02	REG 03	REG 04	REG 05	REG 06	REG 07	REG 08	REG 09	REG 10	NATIONAL
04	$ .00 N= 0	$ .00 N= 0	$ 11.23 N= 1	$ .00 N= 0	$ 17.98 N= 4	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 14.42 N= 9	$ .00 N= 0	$ 15.21 N= 14
06	$ 30.96 N= 11	$ .00 N= 0	$ 39.80 N= 20	$ .00 N= 0	$ 17.42 N= 45	$ 12.09 N= 14	$ .00 N= 0	$ 32.38 N= 1	$ 21.39 N= 12	$ 38.06 N= 1	$ 23.24 N= 104
08	$ 39.06 N= 31	$ 4[illegible].14 N= 54	$ 35.92 N= 117	$ 18.45 N= 32	$ 29.80 N= 190	$ 19.73 N= 70	$ 17.70 N= 6	$ 22.57 N= 3	$ 29.56 N= 14	$ 42.91 N= 2	$ 30.82 N= 519
10	$ 58.50 N= 22	$ 46.71 N= 19	$ 46.40 N= 59	$ 22.48 N= 29	$ 34.79 N= 109	$ 26.83 N= 40	$ .00 N= 0	$ 18.13 N= 1	$ 45.57 N= 13	$ .00 N= 0	$ 37.81 N= 292
12	$ 63.49 N= 20	$ 66.79 N= 33	$ 41.81 N= 32	$ 33.37 N= 13	$ 48.63 N= 140	$ 38.06 N= 56	$ 29.48 N= 1	$ .00 N= 0	$ 53.38 N= 6	$ .00 N= 0	$ 48.29 N= 301
15	$ 87.84 N= 12	$ 77.03 N= 11	$ 79.64 N= 26	$ 38.84 N= 9	$ 46.55 N= 50	$ 27.25 N= 15	$ .00 N= 0	$ 44.12 N= 1	$ 40.81 N= 2	$ .00 N= 0	$ 57.37 N= 128
16	$ .00 N= 0	$ 90.02 N= 14	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 90.02 N= 14
18	$ .00 N= 0	$ 118.70 N= 14	$ 62.38 N= 21	$ 44.02 N= 15	$ 68.66 N= 42	$ 53.87 N= 32	$ 32.56 N= 1	$ .00 N= 0	$ 108.71 N= 7	$ .00 N= 0	$ 68.43 N= 132
21	$ .00 N= 0	$ 208.46 N= 5	$ 81.77 N= 16	$ .00 N= 0	$ 62.11 N= 9	$ 57.51 N= 20	$ .00 N= 0	$ .00 N= 0	$ 73.14 N= 6	$ .00 N= 0	$ 80.33 N= 56
24	$ .00 N= 0	$ .00 N= 0	$ 117.75 N= 13	$ 98.71 N= 16	$ 81.12 N= 20	$ 78.66 N= 22	$ 54.95 N= 1	$ .00 N= 0	$ 78.55 N= 3	$ .00 N= 0	$ 90.05 N= 75
27	$ .00 N= 0	$ .00 N= 0	$ 280.16 N= 3	$ .00 N= 0	$ 147.06 N= 3	$ 77.10 N= 11	$ .00 N= 0	$ .00 N= 0	$ 105.66 N= 1	$ .00 N= 0	$ 124.19 N= 18
30	$ .00 N= 0	$ .00 N= 0	$ 500.40 N= 2	$ .00 N= 0	$ 107.46 N= 11	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 113.33 N= 7	$ .00 N= 0	$ 148.81 N= 20
36	$ .00 N= 0	$ .00 N= 0	$ 506.55 N= 1	$ .00 N= 0	$ 136.06 N= 14	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 160.76 N= 15
42	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 117.04 N= 3	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 117.04 N= 3
48	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 139.26 N= 3	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 220.65 N= 1	$ .00 N= 0	$ 159.61 N= 4

TABLE D.2-C SUMMARY

SANITARY SEWERS
AVERAGE COST PER FOOT OF PIPE (NATIONAL)

(VITRIFIED CLAY PIPE)

DIAM	UNIT COST	APPURT ($/FT)	NON-CONS ($/FT)	TOTAL COST ($/FT)	
04	$ 12.80	$ 1.42	$ .97	$ 15.21	(N= 14)
06	$ 15.04	$ 3.70	$ 4.49	$ 23.24	(N= 104)
08	$ 20.40	$ 5.54	$ 4.86	$ 30.82	(N= 519)
10	$ 22.63	$ 8.23	$ 6.94	$ 37.81	(N= 292)
12	$ 28.10	$ 10.04	$ 10.14	$ 48.29	(N= 301)
15	$ 32.24	$ 13.53	$ 11.58	$ 57.37	(N= 128)
16	$ 40.52	$ 19.57	$ 29.92	$ 90.02	(N= 14)
18	$ 36.72	$ 17.74	$ 13.96	$ 68.43	(N= 132)
21	$ 44.99	$ 22.22	$ 13.11	$ 80.33	(N= 56)
24	$ 47.05	$ 18.69	$ 24.30	$ 90.05	(N= 75)
27	$ 74.85	$ 30.45	$ 18.88	$ 124.19	(N= 18)
30	$ 90.93	$ 28.06	$ 29.81	$ 148.81	(N= 20)
36	$ 89.27	$ 42.43	$ 29.05	$ 160.76	(N= 15)
42	$ 79.89	$ 11.34	$ 25.80	$ 117.04	(N= 3)
48	$ 89.53	$ 33.34	$ 36.73	$ 159.61	(N= 4)

SANITARY SEWERS
AVERAGE TOTAL COST PER FOOT OF PIPE

(CAST IRON PIPE)

DIAM	REG 01	REG 02	REG 03	REG 04	REG 05	REG 06	REG 07	REG 08	REG 09	REG 10	NATIONAL
04	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 7.10 N= 2	$ 11.13 N= 2	$ .00 N= 0	$ 6.77 N= 1	$ .00 N= 0	$ .00 N= 0	$ 8.64 N= 5
06	$ .00 N= 0	$ .00 N= 0	$ 35.68 N= 3	$ .00 N= 0	$ .00 N= 0	$ 25.68 N= 7	$ .00 N= 0	$ .00 N= 0	$ 32.94 N= 1	$ 41.21 N= 1	$ 30.08 N= 12
08	$ 31.72 N= 1	$ .00 N= 0	$ 37.04 N= 20	$ 18.25 N= 7	$ 77.19 N= 5	$ 26.39 N= 14	$ .00 N= 0	$ 27.97 N= 1	$ .00 N= 0	$ 56.65 N= 1	$ 35.51 N= 49
10	$ 41.26 N= 2	$ .00 N= 0	$ 63.60 N= 5	$ 31.48 N= 13	$ 63.02 N= 7	$ 34.40 N= 6	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 46.52 N= 1	$ 44.23 N= 34
12	$ 56.02 N= 1	$ 32.13 N= 1	$ 58.00 N= 9	$ 39.77 N= 5	$ 63.75 N= 4	$ 53.73 N= 22	$ .00 N= 0	$ .00 N= 0	$ 126.09 N= 1	$ 98.76 N= 1	$ 56.16 N= 44
15	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 150.78 N= 3	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 147.27 N= 1	$ 149.90 N= 4
16	$ 151.67 N= 3	$ .00 N= 0	$ 36.28 N= 1	$ 44.74 N= 3	$ 54.21 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 81.55 N= 9
18	$ .00 N= 0	$ 133.44 N= 2	$ 141.10 N= 1	$ .00 N= 0	$ 83.27 N= 2	$ 80.86 N= 9	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 93.02 N= 14
21	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 206.25 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 206.25 N= 1
24	$ .00 N= 0	$ 224.35 N= 2	$ 832.32 N= 1	$ 44.67 N= 2	$ 215.95 N= 2	$ 139.90 N= 9	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 191.36 N= 16

TABLE D.2-D SUMMARY

SANITARY SEWERS
AVERAGE COST PER FOOT OF PIPE (NATIONAL)

(CAST IRON PIPE)

DIAM	UNIT COST	APPURT ($/FT)	NON-CONS ($/FT)	TOTAL COST ($/FT)	
04	$ 7.32	$ 1.04	$ .28	$ 8.64	(N= 5)
06	$ 20.80	$ 5.26	$ 4.01	$ 30.08	(N= 12)
08	$ 27.08	$ 5.44	$ 2.98	$ 35.51	(N= 49)
10	$ 31.15	$ 6.97	$ 6.10	$ 44.23	(N= 34)
12	$ 38.88	$ 10.82	$ 6.45	$ 56.16	(N= 44)
15	$ 110.86	$ 25.60	$ 13.44	$ 149.90	(N= 4)
16	$ 40.75	$ 28.19	$ 12.60	$ 81.55	(N= 9)
18	$ 54.62	$ 22.23	$ 16.16	$ 93.02	(N= 14)
21	$ 176.02	$ 16.31	$ 13.90	$ 206.25	(N= 1)
24	$ 124.14	$ 39.09	$ 28.11	$ 191.36	(N= 16)

TABLE D.2-E

SANITARY SEWERS
AVERAGE TOTAL COST PER FOOT OF PIPE

(REINFORCED CONCRETE PIPE)

DIAM	REG 01	REG 02	REG 03	REG 04	REG 05	REG 06	REG 07	REG 08	REG 09	REG 10	NATIONAL
04	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 14.85 N= 4	$ 14.85 N= 4
06	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 17.14 N= 4	$ 17.14 N= 4
08	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 26.48 N= 3	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 17.38 N= 3	$ 18.33 N= 1	$ 19.16 N= 4	$ 20.59 N= 11
10	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 23.11 N= 3	$ .00 N= 0	$ .00 N= 0	$ 21.94 N= 2	$ .00 N= 0	$ 24.12 N= 4	$ 23.30 N= 9
12	$ 38.05 N= 4	$ .00 N= 0	$ 33.02 N= 5	$ 20.88 N= 1	$ 72.58 N= 14	$ .00 N= 0	$ .00 N= 0	$ 29.95 N= 6	$ .00 N= 0	$ .00 N= 0	$ 51.14 N= 30
15	$ 96.77 N= 9	$ .00 N= 0	$ 40.25 N= 4	$ 26.82 N= 10	$ 83.53 N= 54	$ .00 N= 0	$ .00 N= 0	$ 18.31 N= 1	$ .00 N= 0	$ .00 N= 0	$ 74.73 N= 78
16	$ .00 N= 0	$ 65.64 N= 8	$ .00 N= 0	$ .00 N= 0	$ 127.43 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 72.50 N= 9
18	$ 132.09 N= 13	$ 160.82 N= 15	$ 125.05 N= 7	$ 38.05 N= 25	$ 71.86 N= 63	$ 42.76 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 84.89 N= 124
21	$ 150.81 N= 5	$ 143.18 N= 21	$ 164.17 N= 5	$ 36.34 N= 6	$ 78.98 N= 74	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 49.31 N= 1	$ .00 N= 0	$ 95.48 N= 112
24	$ 201.03 N= 16	$ 161.66 N= 38	$ 82.06 N= 31	$ 57.99 N= 46	$ 83.45 N= 93	$ .00 N= 0	$ .00 N= 0	$ 46.31 N= 3	$ .00 N= 0	$ .00 N= 0	$ 98.99 N= 227
27	$ .00 N= 0	$ 137.80 N= 18	$ 137.70 N= 4	$ 96.30 N= 4	$ 125.92 N= 42	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 66.05 N= 1	$ .00 N= 0	$ 127.11 N= 69
30	$ 185.02 N= 13	$ 184.56 N= 77	$ 159.03 N= 14	$ 95.02 N= 49	$ 107.39 N= 70	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 71.15 N= 1	$ .00 N= 0	$ 138.78 N= 224
36	$ 238.03 N= 13	$ 228.06 N= 102	$ 95.02 N= 12	$ 166.60 N= 48	$ 149.14 N= 59	$ .00 N= 0	$ .00 N= 0	$ 91.63 N= 1	$ 108.03 N= 7	$ 220.63 N= 1	$ 187.01 N= 243
42	$ 265.07 N= 2	$ 270.64 N= 21	$ 260.86 N= 3	$ 192.79 N= 25	$ 239.16 N= 56	$ .00 N= 0	$ .00 N= 0	$ 107.07 N= 3	$ 254.37 N= 13	$ 253.34 N= 1	$ 234.60 N= 124
48	$ 449.96 N= 7	$ 266.93 N= 21	$ 164.47 N= 5	$ 197.66 N= 10	$ 252.51 N= 25	$ .00 N= 0	$ .00 N= 0	$ 439.10 N= 1	$ 233.89 N= 13	$ 266.78 N= 1	$ 260.40 N= 83
54	$ .00 N= 0	$ 366.01 N= 8	$ .00 N= 0	$ 268.71 N= 36	$ 188.98 N= 15	$ .00 N= 0	$ .00 N= 0	$ 282.98 N= 1	$ 235.96 N= 1	$ .00 N= 0	$ 261.56 N= 61
60	$ 498.17 N= 1	$ 377.35 N= 43	$ .00 N= 0	$ 265.58 N= 12	$ 385.10 N= 27	$ .00 N= 0	$ .00 N= 0	$ 348.82 N= 5	$ 387.39 N= 1	$ .00 N= 0	$ 364.50 N= 89
66	$ .00 N= 0	$ 490.56 N= 10	$ .00 N= 0	$ .00 N= 0	$ 299.60 N= 14	$ .00 N= 0	$ .00 N= 0	$ 360.73 N= 10	$ 307.58 N= 2	$ .00 N= 0	$ 370.07 N= 36

TABLE D.2-E (Continued)

72	$ .00 N= 0	$ 517.96 N= 21	$ 277.59 N= 9	$ .00 N= 0	$ 293.77 N= 16	$ .00 N= 0	$ .00 N= 0	$ 462.60 N= 21	$ 319.46 N= 2	$ .00 N= 0	$ 412.02 N= 69
78	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 378.89 N= 3	$ .00 N= 0	$ .00 N= 0	$ 467.45 N= 23	$ 341.19 N= 5	$ .00 N= 0	$ 438.52 N= 31
84	$ .00 N= 0	$1254.55 N= 2	$ .00 N= 0	$ .00 N= 0	$ 542.39 N= 4	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 779.78 N= 6
90	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 537.29 N= 3	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 537.29 N= 3
96	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 465.56 N= 1	$ .00 N= 0	$ 465.56 N= 1

TABLE D.2-E SUMMARY

SANITARY SEWERS
AVERAGE COST PER FOOT OF PIPE (NATIONAL)

(REINFORCED CONCRETE PIPE)

DIAM	UNIT COST	APPURT ($/FT)	NON-CONS ($/FT)	TOTAL COST ($/FT)	
04	$ 13.02	$ .83	$ .99	$ 14.85	(N= 4)
06	$ 13.02	$ 1.87	$ 2.24	$ 17.14	(N= 4)
08	$ 15.08	$ 2.68	$ 2.82	$ 20.59	(N= 11)
10	$ 13.68	$ 5.29	$ 4.32	$ 23.30	(N= 9)
12	$ 21.35	$ 21.79	$ 7.99	$ 51.14	(N= 30)
15	$ 30.13	$ 31.06	$ 13.54	$ 74.73	(N= 78)
16	$ 59.75	$ 7.09	$ 5.65	$ 72.50	(N= 9)
18	$ 46.56	$ 24.01	$ 14.30	$ 84.89	(N= 124)
21	$ 45.52	$ 25.86	$ 24.09	$ 95.48	(N= 112)
24	$ 45.70	$ 32.94	$ 20.34	$ 98.99	(N= 227)
27	$ 63.78	$ 38.87	$ 24.46	$ 127.11	(N= 69)
30	$ 65.53	$ 40.49	$ 32.74	$ 138.78	(N= 224)
36	$ 86.43	$ 58.53	$ 42.03	$ 187.01	(N= 243)
42	$ 136.00	$ 57.77	$ 40.82	$ 234.60	(N= 124)
48	$ 132.54	$ 71.50	$ 56.35	$ 260.40	(N= 83)
54	$ 151.83	$ 56.23	$ 53.49	$ 261.56	(N= 61)
60	$ 191.60	$ 108.68	$ 64.21	$ 364.50	(N= 89)
66	$ 215.20	$ 90.90	$ 63.96	$ 370.06	(N= 36)
72	$ 239.63	$ 103.33	$ 69.04	$ 412.02	(N= 69)
78	$ 255.20	$ 109.80	$ 73.50	$ 438.52	(N= 31)
84	$ 482.69	$ 159.24	$ 137.84	$ 779.78	(N= 6)
90	$ 263.78	$ 151.62	$ 121.88	$ 537.29	(N= 3)
96	$ 298.51	$ 87.71	$ 79.33	$ 465.56	(N= 1)

TABLE D.2-F

SANITARY SEWERS
AVERAGE TOTAL COST PER FOOT OF PIPE

(DUCTILE IRON PIPE)

DIAM	REG 01	REG 02	REG 03	REG 04	REG 05	REG 06	REG 07	REG 08	REG 09	REG 10	NATIONAL
06	$ .00 N= 0	$ 21.30 N= 2	$ 25.98 N= 2	$ .00 N= 0	$ 26.65 N= 5	$ .00 N= 0	$ 20.12 N= 2	$ .00 N= 0	$ 21.82 N= 2	$ 51.32 N= 2	$ 27.62 N= 15
08	$ 49.47 N= 5	$ 58.93 N= 28	$ 42.46 N= 23	$ 16.56 N= 3	$ 56.78 N= 20	$ 43.66 N= 2	$ 20.44 N= 1	$ 24.34 N= 2	$ 33.24 N= 1	$ 19.28 N= 1	$ 49.63 N= 86
10	$ 73.20 N= 10	$ 41.99 N= 4	$ 46.65 N= 8	$ 31.24 N= 11	$ 43.65 N= 12	$ 28.63 N= 1	$ 30.24 N= 1	$ 39.20 N= 2	$ 45.49 N= 1	$ .00 N= 0	$ 46.47 N= 50
12	$ 78.10 N= 3	$ 94.02 N= 9	$ 83.13 N= 3	$ 30.09 N= 3	$ 60.45 N= 19	$ 117.62 N= 1	$ 32.74 N= 1	$ 38.19 N= 3	$ 60.30 N= 1	$ 49.12 N= 1	$ 66.89 N= 44
15	$ .00 N= 0	$ .00 N= 0	$ 80.07 N= 1	$ .00 N= 0	$ 54.32 N= 1	$ 55.88 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 63.43 N= 3
16	$ .00 N= 0	$ 75.20 N= 6	$ 70.91 N= 6	$ 55.16 N= 12	$ 69.16 N= 6	$ .00 N= 0	$ .00 N= 0	$ 46.18 N= 2	$ .00 N= 0	$ .00 N= 0	$ 63.93 N= 32
18	$ 159.81 N= 4	$ 156.76 N= 1	$ 101.38 N= 5	$ 68.91 N= 15	$ 98.81 N= 8	$ 67.53 N= 11	$ 48.61 N= 2	$ 49.60 N= 2	$ .00 N= 0	$ .00 N= 0	$ 84.71 N= 48
21	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 56.91 N= 1	$ .00 N= 0	$ .00 N= 0	$ 56.91 N= 1
24	$ .00 N= 0	$ 104.70 N= 2	$ 87.70 N= 2	$ 123.11 N= 27	$ 137.52 N= 3	$ 90.58 N= 1	$ 61.66 N= 1	$ 68.01 N= 2	$ 29.74 N= 1	$ .00 N= 0	$ 113.83 N= 39
30	$ 261.34 N= 1	$ .00 N= 0	$ .00 N= 0	$ 131.21 N= 14	$ 170.42 N= 3	$ .00 N= 0	$ .00 N= 0	$ 116.50 N= 1	$ .00 N= 0	$ .00 N= 0	$ 143.47 N= 19
36	$ .00 N= 0	$ .00 N= 0	$ 231.79 N= 2	$ 274.57 N= 6	$ 187.76 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 114.85 N= 2	$ .00 N= 0	$ 229.86 N= 11
42	$ .00 N= 0	$ .00 N= 0	$ 339.58 N= 2	$ 378.94 N= 9	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 371.79 N= 11

TABLE D.2-F SUMMARY

SANITARY SEWERS
AVERAGE COST PER FOOT OF PIPE (NATIONAL)

(DUCTILE IRON PIPE)

DIAM	UNIT COST	APPURT ($/FT)	NON-CONS ($/FT)	TOTAL COST ($/FT)	
04	$ 21.59	$ 3.17	$ 2.84	$ 27.62	(N= 15)
08	$ 31.15	$ 9.13	$ 9.34	$ 49.63	(N= 86)
10	$ 28.16	$ 7.86	$ 10.43	$ 46.47	(N= 50)
12	$ 39.44	$ 15.20	$ 12.16	$ 66.89	(N= 44)
15	$ 35.71	$ 13.71	$ 13.99	$ 63.43	(N= 3)
16	$ 36.79	$ 12.62	$ 14.51	$ 63.93	(N= 32)
18	$ 45.97	$ 20.79	$ 17.95	$ 84.71	(N= 48)
21	$ 37.04	$ 13.12	$ 6.74	$ 56.91	(N= 1)
24	$ 66.19	$ 29.14	$ 18.48	$ 113.83	(N= 39)
30	$ 97.12	$ 23.71	$ 22.63	$ 143.47	(N= 19)
36	$ 160.57	$ 32.31	$ 36.97	$ 229.86	(N= 11)
42	$ 268.17	$ 46.93	$ 56.68	$ 371.79	(N= 11)

TABLE D.2-G

SANITARY SEWERS
AVERAGE TOTAL COST PER FOOT OF PIPE

(OTHER PIPE)

DIAM	REG 01	REG 02	REG 03	REG 04	REG 05	REG 06	REG 07	REG 08	REG 09	REG 10	NATIONAL
04	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 16.63 N= 1	$ .00 N= 0	$ .00 N= 0	$ 4.88 N= 1	$ .00 N= 0	$ .00 N= 0	$ 10.76 N= 2
06	$ 23.89 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 17.18 N= 8	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 17.93 N= 9
08	$ .00 N= 0	$ .00 N= 0	$ 49.24 N= 5	$ .00 N= 0	$ 23.31 N= 43	$ 21.76 N= 9	$ 30.79 N= 1	$ 13.78 N= 2	$ .00 N= 0	$ .00 N= 0	$ 25.05 N= 60
10	$ 36.07 N= 1	$ .00 N= 0	$ 79.83 N= 6	$ .00 N= 0	$ 31.91 N= 40	$ .00 N= 0	$ 39.18 N= 1	$ 18.68 N= 2	$ .00 N= 0	$ .00 N= 0	$ 37.36 N= 50
12	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 41.02 N= 41	$ 55.99 N= 3	$ 49.22 N= 1	$ 31.81 N= 2	$ .00 N= 0	$ .00 N= 0	$ 41.76 N= 47
15	$ .00 N= 0	$ .00 N= 0	$ 69.27 N= 4	$ .00 N= 0	$ 50.16 N= 27	$ .00 N= 0	$ 68.88 N= 1	$ 40.08 N= 1	$ .00 N= 0	$ .00 N= 0	$ 52.74 N= 33
16	$ .00 N= 0	$ .00 N= 0	$ 49.95 N= 2	$ .00 N= 0	$ 101.50 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 75.73 N= 4
18	$ .00 N= 0	$ .00 N= 0	$ 108.00 N= 1	$ .00 N= 0	$ 62.23 N= 19	$ 34.95 N= 1	$ 37.39 N= 1	$ 55.68 N= 1	$ .00 N= 0	$ .00 N= 0	$ 61.67 N= 23
21	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 63.28 N= 8	$ .00 N= 0	$ 43.29 N= 1	$ 72.38 N= 1	$ 50.93 N= 1	$ .00 N= 0	$ 61.17 N= 11
24	$ .00 N= 0	$ 185.46 N= 4	$ .00 N= 0	$ .00 N= 0	$ 85.84 N= 27	$ .00 N= 0	$ 54.70 N= 1	$ 91.63 N= 1	$ 58.96 N= 1	$ .00 N= 0	$ 96.02 N= 34
27	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 118.41 N= 10	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 67.36 N= 1	$ .00 N= 0	$ 113.77 N= 11
30	$ .00 N= 0	$ 285.54 N= 2	$ .00 N= 0	$ 124.33 N= 3	$ 142.88 N= 7	$ 63.54 N= 1	$ 71.99 N= 1	$ .00 N= 0	$ 75.09 N= 1	$ .00 N= 0	$ 143.66 N= 15
36	$ .00 N= 0	$ .00 N= 0	$ 402.13 N= 1	$ .00 N= 0	$ 174.02 N= 17	$ 127.46 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 183.57 N= 19
42	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 198.11 N= 6	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 198.11 N= 6

TABLE D.2-G (Continued)

48	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 314.47 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 314.47 N= 1
54	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 367.88 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 367.88 N= 2
60	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 306.61 N= 12	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 306.61 N= 12
78	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 915.96 N= 3	$ .00 N= 0	$ .00 N= 0	$ 915.96 N= 3

TABLE D.2-G SUMMARY

SANITARY SEWERS
AVERAGE COST PER FOOT OF PIPE (NATIONAL)

(OTHER PIPE)

DIAM	UNIT COST	APPURT ($/FT)	NON-CONS ($/FT)	TOTAL COST ($/FT)
04	$ 9.67	$ .78	$ .30	$ 10.76 (N= 2)
06	$ 12.72	$ 3.29	$ 1.90	$ 17.93 (N= 9)
08	$ 16.98	$ 5.14	$ 2.91	$ 25.05 (N= 60)
10	$ 24.80	$ 8.44	$ 4.10	$ 37.36 (N= 50)
12	$ 25.34	$ 11.17	$ 5.24	$ 41.76 (N= 47)
15	$ 25.30	$ 17.58	$ 9.85	$ 52.74 (N= 33)
16	$ 52.48	$ 13.28	$ 9.96	$ 75.73 (N= 4)
18	$ 32.07	$ 19.28	$ 10.31	$ 61.67 (N= 23)
21	$ 26.15	$ 20.37	$ 14.63	$ 61.17 (N= 11)
24	$ 38.77	$ 35.55	$ 21.69	$ 96.02 (N= 34)
27	$ 51.15	$ 39.23	$ 23.37	$ 113.77 (N= 11)
30	$ 59.34	$ 45.33	$ 38.97	$ 143.66 (N= 15)
36	$ 76.96	$ 78.47	$ 28.12	$ 183.57 (N= 19)
42	$ 69.08	$ 99.00	$ 30.01	$ 198.11 (N= 6)
48	$ 71.58	$ 167.83	$ 75.04	$ 314.47 (N= 1)
54	$ 83.10	$ 209.80	$ 74.96	$ 367.88 (N= 2)
60	$ 180.67	$ 55.76	$ 70.17	$ 306.61 (N= 12)
78	$ 699.32	$ 138.49	$ 78.14	$ 915.96 (N= 3)

TABLE D.3-A

SANITARY SEWERS
AVERAGE TOTAL COST PER FOOT OF PIPE

(DEPTH < 8 FT.)

DIAM	REG 01	REG 02	REG 03	REG 04	REG 05	REG 06	REG 07	REG 08	REG 09	REG 10	NATIONAL
04	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 12.37 N= 1	$ 12.37 N= 1
06	$ .00 N= 0	$ .00 N= 0	$ 22.06 N= 2	$ .00 N= 0	$ .00 N= 0	$ 13.98 N= 4	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 14.66 N= 1	$ 16.38 N= 7
08	$ 30.97 N= 3	$ 29.07 N= 20	$ 25.68 N= 42	$ 15.44 N= 15	$ 18.84 N= 22	$ 14.47 N= 26	$ 17.46 N= 1	$ 16.35 N= 1	$ 16.47 N= 1	$ 34.23 N= 2	$ 21.76 N= 133
10	$ .00 N= 0	$ 38.10 N= 6	$ 28.25 N= 17	$ 21.86 N= 19	$ 36.50 N= 16	$ 18.88 N= 16	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 21.64 N= 1	$ 27.09 N= 75
12	$ 54.18 N= 4	$ 69.36 N= 8	$ 34.26 N= 16	$ 24.18 N= 7	$ 30.85 N= 6	$ 29.18 N= 18	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 37.28 N= 59
15	$ 116.94 N= 1	$ 60.38 N= 3	$ 46.44 N= 12	$ 28.82 N= 6	$ 48.42 N= 3	$ 25.17 N= 8	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 41.67 N= 33
16	$ 67.65 N= 2	$ 65.65 N= 3	$ .00 N= 0	$ 46.80 N= 4	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 57.72 N= 9
18	$ 158.99 N= 1	$ 160.76 N= 4	$ 54.80 N= 11	$ 37.28 N= 10	$ 56.53 N= 9	$ 44.95 N= 10	$ .00 N= 0	$ .00 N= 0	$ 60.94 N= 1	$ .00 N= 0	$ 60.80 N= 46
21	$ .00 N= 0	$ 160.24 N= 5	$ 49.20 N= 3	$ 31.45 N= 1	$ 57.25 N= 3	$ 53.74 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 89.96 N= 14
24	$ .00 N= 0	$ 131.05 N= 2	$ 62.89 N= 4	$ 67.30 N= 10	$ 106.49 N= 6	$ 78.34 N= 4	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 82.27 N= 26
27	$ .00 N= 0	$ 75.31 N= 2	$ .00 N= 0	$ .00 N= 0	$ 164.81 N= 1	$ 70.98 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 96.60 N= 4
30	$ 138.26 N= 3	$ 155.17 N= 3	$ 104.49 N= 1	$ 101.26 N= 5	$ 157.60 N= 7	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 136.54 N= 19
36	$ 183.24 N= 1	$ 183.65 N= 4	$ 66.30 N= 1	$ 325.80 N= 2	$ 145.93 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 197.96 N= 9
42	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 364.40 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 364.40 N= 1
48	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 176.86 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 176.86 N= 1

TABLE D.3-A SUMMARY

SANITARY SEWERS
AVERAGE COST PER FOOT OF PIPE (NATIONAL)

(DEPTH < 8 FT.)

DIAM	UNIT COST	APPURT ($/FT)	NON-CONS ($/FT)	TOTAL COST ($/FT)	
04	$ 10.53	$ .83	$ .99	$ 12.37	(N= 1)
06	$ 10.74	$ 1.82	$ 3.81	$ 16.38	(N= 7)
08	$ 12.90	$ 4.51	$ 4.34	$ 21.76	(N= 133)
10	$ 13.65	$ 6.69	$ 6.74	$ 27.09	(N= 75)
12	$ 19.84	$ 8.50	$ 8.93	$ 37.28	(N= 59)
15	$ 18.30	$ 11.78	$ 11.58	$ 41.67	(N= 33)
16	$ 33.43	$ 10.12	$ 14.15	$ 57.72	(N= 9)
18	$ 24.14	$ 17.40	$ 19.25	$ 60.80	(N= 46)
21	$ 28.28	$ 25.48	$ 36.19	$ 89.96	(N= 14)
24	$ 35.86	$ 23.70	$ 22.70	$ 82.27	(N= 26)
27	$ 42.91	$ 38.85	$ 14.83	$ 96.60	(N= 4)
30	$ 56.24	$ 45.84	$ 34.46	$ 136.54	(N= 19)
36	$ 77.26	$ 33.21	$ 87.49	$ 197.96	(N= 9)
42	$ 280.26	$ 41.06	$ 43.06	$ 364.40	(N= 1)
48	$ 66.97	$ 53.63	$ 56.25	$ 176.86	(N= 1)

TABLE D.3-B

SANITARY SEWERS
AVERAGE TOTAL COST PER FOOT OF PIPE

(DEPTH 8-15 FT.)

DIAM	REG 01	REG 02	REG 03	REG 04	REG 05	REG 06	REG 07	REG 08	REG 09	REG 10	NATIONAL
04	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 13.15 N= 7	$ 13.15 N= 7
06	$ 33.94 N= 9	$ .00 N= 0	$ 30.26 N= 5	$ .00 N= 0	$ 27.37 N= 17	$ 15.01 N= 9	$ .00 N= 0	$ 10.53 N= 5	$ .00 N= 0	$ 17.97 N= 3	$ 24.24 N= 48
08	$ 43.61 N= 54	$ 37.34 N= 78	$ 30.06 N= 149	$ 18.16 N= 34	$ 33.31 N= 183	$ 20.51 N= 93	$ 18.72 N= 3	$ 17.95 N= 24	$ .00 N= 0	$ 41.99 N= 19	$ 30.85 N= 637
10	$ 73.96 N= 37	$ 42.05 N= 31	$ 37.24 N= 86	$ 26.21 N= 66	$ 35.48 N= 120	$ 26.89 N= 60	$ .00 N= 0	$ 25.21 N= 4	$ .00 N= 0	$ 24.95 N= 3	$ 36.90 N= 407
12	$ 62.92 N= 33	$ 65.70 N= 40	$ 39.48 N= 62	$ 30.50 N= 35	$ 48.63 N= 92	$ 35.82 N= 78	$ .00 N= 0	$ 32.51 N= 4	$ .00 N= 0	$ .00 N= 0	$ 45.40 N= 344
15	$ 105.78 N= 17	$ 69.58 N= 10	$ 50.85 N= 42	$ 36.69 N= 22	$ 81.50 N= 57	$ 37.76 N= 37	$ .00 N= 0	$ 52.45 N= 3	$ .00 N= 0	$ .00 N= 0	$ 61.90 N= 188
16	$ 131.76 N= 6	$ 66.86 N= 21	$ 66.74 N= 3	$ 47.29 N= 8	$ 74.80 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 106.75 N= 3	$ 75.43 N= 42
18	$ 147.51 N= 17	$ 91.86 N= 28	$ 61.24 N= 42	$ 43.49 N= 38	$ 57.71 N= 59	$ 54.49 N= 41	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 132.80 N= 2	$ 67.00 N= 227
21	$ 177.39 N= 4	$ 123.10 N= 31	$ 60.42 N= 13	$ 35.82 N= 4	$ 67.87 N= 36	$ 60.66 N= 9	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 87.05 N= 97
24	$ 241.88 N= 5	$ 120.40 N= 41	$ 86.25 N= 32	$ 76.86 N= 47	$ 76.27 N= 57	$ 99.62 N= 23	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 93.45 N= 205
27	$ .00 N= 0	$ 116.45 N= 16	$ .00 N= 0	$ 59.35 N= 1	$ 114.60 N= 18	$ 74.04 N= 4	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 109.78 N= 39
30	$ 183.41 N= 6	$ 145.12 N= 46	$ 106.47 N= 4	$ 101.53 N= 26	$ 87.46 N= 26	$ 137.20 N= 6	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 122.27 N= 114
36	$ 254.61 N= 3	$ 151.13 N= 54	$ 72.54 N= 4	$ 187.00 N= 21	$ 120.15 N= 26	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 150.61 N= 108
42	$ .00 N= 0	$ 180.05 N= 5	$ .00 N= 0	$ 207.31 N= 15	$ 184.46 N= 15	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 193.62 N= 35
48	$ 445.08 N= 1	$ 208.01 N= 3	$ 120.72 N= 4	$ 182.37 N= 4	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 190.12 N= 12

TABLE D.3-B (Continued)

54	$ .00 N= 0	$ 265.79 N= 1	$ .00 N= 0	$ 236.36 N= 9	$ 126.68 N= 4	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 207.12 N= 14
60	$ .00 N= 0	$ 343.43 N= 16	$ .00 N= 0	$ 291.84 N= 4	$ 230.80 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 323.81 N= 22
66	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 287.48 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 287.48 N= 1
72	$ .00 N= 0	$ 434.20 N= 3	$ 273.27 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 369.83 N= 5

TABLE D.3-B SUMMARY

SANITARY SEWERS
AVERAGE COST PER FOOT OF PIPE (NATIONAL)

(DEPTH 8-15 FT.)

DIAM	UNIT COST	APPURT ($/FT)	NON-CONS ($/FT)	TOTAL COST ($/FT)	
04	$ 9.03	$ 2.32	$ 1.79	$ 13.15	(N= 7)
06	$ 15.68	$ 4.90	$ 3.64	$ 24.24	(N= 48)
08	$ 17.83	$ 7.41	$ 5.59	$ 30.85	(N= 637)
10	$ 19.10	$ 9.72	$ 8.08	$ 36.90	(N= 407)
12	$ 22.57	$ 12.58	$ 10.23	$ 45.40	(N= 344)
15	$ 25.98	$ 21.96	$ 13.95	$ 61.90	(N= 188)
16	$ 36.20	$ 17.39	$ 21.83	$ 75.43	(N= 42)
18	$ 31.07	$ 19.35	$ 16.57	$ 67.00	(N= 227)
21	$ 39.06	$ 23.97	$ 24.01	$ 87.05	(N= 97)
24	$ 41.58	$ 25.96	$ 25.90	$ 93.45	(N= 205)
27	$ 54.29	$ 32.11	$ 23.36	$ 109.78	(N= 39)
30	$ 54.89	$ 28.86	$ 38.51	$ 122.27	(N= 114)
36	$ 71.55	$ 35.58	$ 43.47	$ 150.61	(N= 108)
42	$ 126.41	$ 37.41	$ 29.78	$ 193.62	(N= 35)
48	$ 77.14	$ 58.21	$ 54.76	$ 190.12	(N= 12)
54	$ 111.08	$ 50.96	$ 45.08	$ 207.12	(N= 14)
60	$ 174.86	$ 85.01	$ 63.94	$ 323.81	(N= 22)
66	$ 121.06	$ 110.76	$ 55.64	$ 287.48	(N= 1)
72	$ 184.13	$ 107.69	$ 78.00	$ 369.83	(N= 5)

TABLE D.3-C

SANITARY SEWERS
AVERAGE TOTAL COST PER FOOT OF PIPE

(DEPTH > 15 FT.)

DIAM	REG 01	REG 02	REG 03	REG 04	REG 05	REG 06	REG 07	REG 08	REG 09	REG 10	NATIONAL
06	$ .00 N= 0	$ .00 N= 0	$ 62.45 N= 2	$ .00 N= 0	$ 24.80 N= 2	$ 13.88 N= 1	$ .00 N= 0	$ 13.99 N= 1	$ .00 N= 0	$ .00 N= 0	$ 33.73 N= 6
08	$ 52.52 N= 22	$ 53.36 N= 48	$ 39.28 N= 48	$ 27.88 N= 5	$ 46.72 N= 108	$ 32.93 N= 27	$ .00 N= 0	$ 21.19 N= 13	$ .00 N= 0	$ 53.75 N= 6	$ 44.31 N= 277
10	$ 114.99 N= 12	$ 60.91 N= 18	$ 57.29 N= 29	$ 32.02 N= 17	$ 43.59 N= 83	$ 41.74 N= 14	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 51.36 N= 173
12	$ 86.99 N= 10	$ 86.90 N= 28	$ 52.94 N= 14	$ 56.02 N= 13	$ 53.09 N= 89	$ 58.70 N= 19	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 61.35 N= 173
15	$ 104.97 N= 7	$ 101.12 N= 7	$ 70.21 N= 15	$ 67.56 N= 13	$ 62.75 N= 40	$ 52.51 N= 3	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 71.08 N= 85
16	$ 84.41 N= 2	$ 77.92 N= 13	$ 81.63 N= 2	$ 76.88 N= 3	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 112.84 N= 1	$ 80.40 N= 21
18	$ .00 N= 0	$ 87.85 N= 13	$ 73.46 N= 20	$ 65.02 N= 12	$ 73.29 N= 43	$ 69.74 N= 24	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 137.20 N= 1	$ 73.93 N= 113
21	$ 120.99 N= 2	$ 191.02 N= 10	$ 108.27 N= 12	$ 43.30 N= 1	$ 84.60 N= 36	$ 56.05 N= 8	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 101.29 N= 69
24	$ 250.81 N= 5	$ 119.86 N= 21	$ 113.96 N= 15	$ 112.39 N= 37	$ 86.93 N= 54	$ 96.45 N= 10	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 107.73 N= 142
27	$ .00 N= 0	$ 138.95 N= 4	$ .00 N= 0	$ 64.00 N= 2	$ 125.23 N= 32	$ 80.16 N= 6	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 117.55 N= 44
30	$ 215.13 N= 4	$ 184.10 N= 30	$ 121.14 N= 6	$ 95.59 N= 31	$ 116.15 N= 44	$ 140.30 N= 4	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 132.32 N= 119
36	$ 226.64 N= 5	$ 176.37 N= 51	$ 100.23 N= 5	$ 145.10 N= 28	$ 144.73 N= 29	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 160.08 N= 118
42	$ .00 N= 0	$ 298.95 N= 16	$ .00 N= 0	$ 264.24 N= 18	$ 207.15 N= 19	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 254.25 N= 53
48	$ 514.39 N= 4	$ 257.43 N= 14	$ .00 N= 0	$ 214.04 N= 5	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 292.69 N= 23
54	$ .00 N= 0	$ 284.79 N= 2	$ .00 N= 0	$ 279.49 N= 27	$ 349.90 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 282.19 N= 30

TABLE D.3-C (Continued)

60	$ .00 N= 0	$ 374.98 N= 23	$ .00 N= 0	$ 284.95 N= 20	$ 283.54 N= 16	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 319.66 N= 59
66	$ 00 N= 0	$ 436.82 N= 7	$ .00 N= 0	$ .00 N= 0	$ 294.83 N= 5	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 377.66 N= 12
72	$ .00 N= 0	$ 487.13 N= 16	$ 278.82 N= 7	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 423.73 N= 23

TABLE D.3-C SUMMARY

SANITARY SEWERS
AVERAGE COST PER FOOT OF PIPE (NATIONAL)

(DEPTH > 15 FT.)

DIAM	UNIT COST	APPURT ($/FT)	NON-CONS ($/FT)	TOTAL COST ($/FT)	
06	$ 25.75	$ 1.07	$ 6.89	$ 33.73	(N= 6)
08	$ 30.11	$ 8.77	$ 5.42	$ 44.31	(N= 277)
10	$ 32.77	$ 10.39	$ 8.18	$ 51.35	(N= 173)
12	$ 39.15	$ 13.10	$ 9.08	$ 61.35	(N= 173)
15	$ 41.90	$ 18.54	$ 10.63	$ 71.08	(N= 85)
16	$ 48.63	$ 12.09	$ 19.68	$ 80.40	(N= 21)
18	$ 45.12	$ 14.58	$ 14.22	$ 73.93	(N= 113)
21	$ 50.53	$ 24.93	$ 25.81	$ 101.29	(N= 69)
24	$ 54.22	$ 30.81	$ 22.68	$ 107.73	(N= 142)
27	$ 64.09	$ 38.29	$ 15.16	$ 117.55	(N= 44)
30	$ 69.60	$ 28.93	$ 33.78	$ 132.31	(N= 119)
36	$ 87.99	$ 35.40	$ 36.67	$ 160.08	(N= 118)
42	$ 164.42	$ 45.24	$ 44.59	$ 254.25	(N= 53)
48	$ 140.02	$ 78.80	$ 73.85	$ 292.69	(N= 23)
54	$ 173.21	$ 52.50	$ 56.47	$ 282.19	(N= 30)
60	$ 190.93	$ 68.14	$ 60.58	$ 319.66	(N= 59)
66	$ 212.54	$ 97.35	$ 67.77	$ 377.66	(N= 12)
72	$ 228.68	$ 113.44	$ 81.60	$ 423.73	(N= 23)

TABLE D.4

SANITARY SEWERS
AVERAGE TOTAL COST PER FOOT OF PIPE

(STANDARD METROPOLITAN STATISTICAL AREAS)

DIAM	REG 01	REG 02	REG 03	REG 04	REG 05	REG 06	REG 07	REG 08	REG 09	REG 10	NATIONAL
04	$ 12.11 N= 1	$ .00 N= 0	$ .00 N= 0	$ 4.51 N= 1	$ 16.69 N= 10	$ 14.43 N= 17	$ .00 N= 0	$ .00 N= 0	$ 11.39 N= 19	$ 16.25 N= 1	$ 13.50 N= 49
06	$ 29.33 N= 19	$ .00 N= 0	$ 35.64 N= 19	$ .00 N= 0	$ 31.47 N= 76	$ 14.24 N= 11	$ .00 N= 0	$ 32.38 N= 1	$ 17.76 N= 22	$ 29.22 N= 2	$ 28.43 N= 150
08	$ 42.89 N= 61	$ 51.62 N= 73	$ 35.95 N= 111	$ 20.74 N= 9	$ 43.27 N= 191	$ 25.35 N= 72	$ .00 N= 0	$ 22.57 N= 3	$ 25.38 N= 16	$ 33.90 N= 6	$ 39.35 N= 542
10	$ 60.67 N= 22	$ 68.95 N= 18	$ 46.58 N= 69	$ 27.23 N= 54	$ 36.24 N= 135	$ 28.35 N= 52	$ .00 N= 0	$ 18.13 N= 1	$ 42.75 N= 12	$ 46.52 N= 1	$ 39.02 N= 364
12	$ 65.39 N= 45	$ 83.98 N= 53	$ 37.88 N= 30	$ 37.24 N= 35	$ 50.22 N= 156	$ 44.38 N= 69	$ .00 N= 0	$ .00 N= 0	$ 54.77 N= 4	$ 58.84 N= 2	$ 53.47 N= 394
15	$ 106.48 N= 23	$ 117.96 N= 19	$ 71.09 N= 41	$ 54.23 N= 24	$ 68.31 N= 104	$ 43.81 N= 25	$ .00 N= 0	$ .00 N= 0	$ 34.97 N= 2	$ 137.06 N= 1	$ 72.44 N= 239
16	$ 112.56 N= 11	$ 73.18 N= 26	$ 48.57 N= 1	$ 57.61 N= 9	$ 88.13 N= 5	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 79.78 N= 52
18	$ 136.32 N= 22	$ 136.39 N= 27	$ 64.00 N= 62	$ 53.80 N= 26	$ 100.31 N= 101	$ 68.99 N= 34	$ 44.03 N= 2	$ .00 N= 0	$ 106.31 N= 7	$ 196.33 N= 1	$ 90.62 N= 282
21	$ 158.59 N= 6	$ 142.83 N= 14	$ 97.10 N= 21	$ .00 N= 0	$ 76.02 N= 47	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 64.12 N= 7	$ .00 N= 0	$ 94.86 N= 95
24	$ 203.79 N= 15	$ 175.66 N= 36	$ 125.06 N= 18	$ 109.90 N= 45	$ 85.35 N= 103	$ 171.33 N= 5	$ .00 N= 0	$ .00 N= 0	$ 59.27 N= 4	$ 326.03 N= 1	$ 118.01 N= 227
27	$ .00 N= 0	$ 214.35 N= 3	$ 219.95 N= 6	$ 96.30 N= 4	$ 125.41 N= 62	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 66.71 N= 2	$ .00 N= 0	$ 133.21 N= 77
30	$ 188.95 N= 14	$ 303.08 N= 27	$ 201.70 N= 16	$ 90.45 N= 52	$ 116.35 N= 86	$ 123.46 N= 8	$ .00 N= 0	$ .00 N= 0	$ 104.39 N= 9	$ 444.67 N= 1	$ 146.18 N= 213
36	$ 230.72 N= 15	$ 433.49 N= 27	$ 513.54 N= 5	$ 166.60 N= 48	$ 160.58 N= 85	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 109.55 N= 9	$ .00 N= 0	$ 213.57 N= 189
42	$ 265.07 N= 2	$ 158.22 N= 1	$ 260.86 N= 3	$ 222.61 N= 12	$ 273.74 N= 49	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 245.58 N= 14	$ .00 N= 0	$ 259.18 N= 81
48	$ 449.96 N= 7	$ 344.38 N= 4	$ 164.47 N= 5	$ .00 N= 0	$ 269.66 N= 43	$ .00 N= 0	$ .00 N= 0	$ 519.96 N= 2	$ 232.94 N= 14	$ .00 N= 0	$ 283.28 N= 75
54	$ .00 N= 0	$ 418.54 N= 5	$ .00 N= 0	$ 268.71 N= 36	$ 221.33 N= 19	$ .00 N= 0	$ .00 N= 0	$ 282.98 N= 1	$ 235.96 N= 1	$ .00 N= 0	$ 265.97 N= 62
60	$ 498.17 N= 1	$ 526.70 N= 4	$ .00 N= 0	$ 286.09 N= 24	$ 458.58 N= 36	$ .00 N= 0	$ .00 N= 0	$ 326.62 N= 6	$ 289.57 N= 2	$ .00 N= 0	$ 390.67 N= 73
66	$ .00 N= 0	$ 615.94 N= 3	$ .00 N= 0	$ .00 N= 0	$ 338.99 N= 21	$ .00 N= 0	$ .00 N= 0	$ 360.73 N= 10	$ 307.58 N= 2	$ .00 N= 0	$ 366.36 N= 36

TABLE D.4 (Continued)

72	$ .00 N= 0	$ 890.26 N= 2	$ 277.59 N= 9	$ .00 N= 0	$ 378.78 N= 6	$ .00 N= 0	$ .00 N= 0	$ 460.02 N= 22	$ 319.46 N= 2	$ .00 N= 0	$ 422.21 N= 41
78	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 393.59 N= 4	$ .00 N= 0	$ .00 N= 0	$ 519.20 N= 26	$ 341.19 N= 5	$ .00 N= 0	$ 479.42 N= 35
84	$ .00 N= 0	$1254.55 N= 2	$ .00 N= 0	$ .00 N= 0	$ 528.75 N= 11	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 340.54 N= 1	$ .00 N= 0	$ 618.99 N= 14
90	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 620.27 N= 4	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 620.27 N= 4
96	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 863.04 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 465.56 N= 1	$ .00 N= 0	$ 730.55 N= 3

TABLE D.4 SUMMARY

SANITARY SEWERS
AVERAGE COST PER FOOT OF PIPE (NATIONAL)

(STANDARD METROPOLITAN STATISTICAL AREAS)

DIAM	UNIT COST	APPURT ($/FT)	NON-CONS ($/FT)	TOTAL COST ($/FT)	
04	$ 11.76	$ .82	$ .91	$ 13.50	(N= 49)
06	$ 16.57	$ 7.49	$ 4.35	$ 28.43	(N= 150)
08	$ 23.90	$ 9.67	$ 5.77	$ 39.35	(N= 542)
10	$ 23.92	$ 9.37	$ 5.72	$ 39.02	(N= 364)
12	$ 29.20	$ 14.92	$ 9.34	$ 53.47	(N= 394)
15	$ 36.91	$ 23.83	$ 11.69	$ 72.44	(N= 239)
16	$ 44.22	$ 18.86	$ 16.69	$ 79.78	(N= 52)
18	$ 44.22	$ 27.73	$ 18.65	$ 90.61	(N= 282)
21	$ 43.73	$ 25.31	$ 25.81	$ 94.86	(N= 95)
24	$ 55.10	$ 36.87	$ 26.03	$ 118.01	(N= 227)
27	$ 68.43	$ 41.36	$ 23.41	$ 133.21	(N= 77)
30	$ 68.78	$ 40.07	$ 37.32	$ 146.18	(N= 213)
36	$ 89.65	$ 72.83	$ 51.07	$ 213.57	(N= 189)
42	$ 119.70	$ 89.73	$ 49.74	$ 259.18	(N= 81)
48	$ 151.66	$ 74.81	$ 56.79	$ 283.28	(N= 75)
54	$ 149.51	$ 62.44	$ 54.01	$ 265.97	(N= 62)
60	$ 183.10	$ 140.28	$ 67.28	$ 390.67	(N= 73)
66	$ 232.67	$ 76.56	$ 57.12	$ 366.36	(N= 36)
72	$ 251.03	$ 99.18	$ 71.99	$ 422.21	(N= 41)
78	$ 294.82	$ 110.24	$ 74.34	$ 479.42	(N= 35)
84	$ 437.68	$ 90.25	$ 91.05	$ 618.99	(N= 14)
90	$ 372.49	$ 124.74	$ 121.03	$ 620.27	(N= 4)
96	$ 563.03	$ 63.43	$ 104.08	$ 730.55	(N= 3)

TABLE D.5

SANITARY SEWERS
AVERAGE TOTAL COST PER FOOT OF PIPE

(NOT STANDARD METROPOLITAN STATISTICAL AREA)

DIAM	REG 01	REG 02	REG 03	REG 04	REG 05	REG 06	REG 07	REG 08	REG 09	REG 10	NATIONAL
04	$ 15.51 N= 1	$ .00 N= 0	$ 10.72 N= 24	$ .00 N= 0	$ 14.21 N= 12	$ 7.85 N= 7	$ 5.52 N= 1	$ 6.87 N= 5	$ 11.39 N= 3	$ 12.08 N= 15	$ 11.08 N= 68
06	$ 25.72 N= 2	$ 21.30 N= 2	$ 21.82 N= 39	$ 9.10 N= 2	$ 17.38 N= 79	$ 17.84 N= 28	$ 16.41 N= 3	$ 11.05 N= 8	$ 21.36 N= 6	$ 30.62 N= 13	$ 19.23 N= 182
08	$ 48.14 N= 26	$ 37.13 N= 89	$ 31.04 N= 205	$ 19.55 N= 58	$ 35.45 N= 285	$ 20.76 N= 117	$ 18.44 N= 9	$ 18.77 N= 54	$ 29.03 N= 13	$ 39.99 N= 43	$ 30.99 N= 899
10	$ 95.48 N= 32	$ 50.81 N= 53	$ 42.30 N= 102	$ 24.86 N= 56	$ 41.44 N= 196	$ 28.21 N= 51	$ 26.73 N= 3	$ 24.66 N= 13	$ 38.05 N= 8	$ 22.67 N= 10	$ 41.88 N= 524
12	$ 55.69 N= 11	$ 67.13 N= 34	$ 46.08 N= 83	$ 31.78 N= 22	$ 50.64 N= 164	$ 38.71 N= 71	$ 31.17 N= 4	$ 32.07 N= 19	$ 45.47 N= 14	$ 60.38 N= 10	$ 47.33 N= 432
15	$ 75.17 N= 6	$ 133.41 N= 4	$ 58.16 N= 39	$ 32.63 N= 18	$ 55.61 N= 80	$ 30.92 N= 28	$ 68.88 N= 1	$ 38.13 N= 11	$ 55.33 N= 8	$ 110.02 N= 4	$ 52.89 N= 199
16	$ 83.38 N= 1	$ 95.70 N= 16	$ 65.67 N= 8	$ 46.28 N= 6	$ 74.93 N= 8	$ .00 N= 0	$ .00 N= 0	$ 46.18 N= 2	$ 57.25 N= 1	$ 102.71 N= 7	$ 79.30 N= 49
18	$ 114.68 N= 3	$ 105.16 N= 29	$ 86.11 N= 27	$ 41.38 N= 34	$ 69.75 N= 83	$ 53.95 N= 55	$ 39.55 N= 2	$ 47.78 N= 6	$ 69.33 N= 6	$ 112.27 N= 6	$ 69.07 N= 251
21	$ .00 N= 0	$ 141.49 N= 32	$ 79.94 N= 16	$ 36.34 N= 6	$ 84.20 N= 49	$ 57.51 N= 20	$ 43.29 N= 1	$ 58.82 N= 3	$ 65.82 N= 6	$ .00 N= 0	$ 89.59 N= 133
24	$ 159.65 N= 1	$ 112.78 N= 37	$ 98.54 N= 41	$ 69.88 N= 53	$ 90.51 N= 62	$ 91.49 N= 37	$ 57.10 N= 3	$ 60.41 N= 8	$ 134.53 N= 6	$ 133.56 N= 8	$ 92.20 N= 256
27	$ .00 N= 0	$ 106.74 N= 23	$ 80.97 N= 2	$ .00 N= 0	$ 89.04 N= 8	$ 77.10 N= 11	$ .00 N= 0	$ .00 N= 0	$ 98.37 N= 10	$ .00 N= 0	$ 95.57 N= 54
30	$ 145.34 N= 3	$ 132.31 N= 58	$ .00 N= 0	$ 154.45 N= 14	$ 117.10 N= 39	$ 153.43 N= 3	$ 71.99 N= 1	$ 105.52 N= 3	$ .00 N= 0	$ 237.77 N= 4	$ 133.11 N= 125
36	$ .00 N= 0	$ 151.52 N= 88	$ 114.56 N= 14	$ 274.57 N= 6	$ 191.73 N= 16	$ 127.46 N= 1	$ .00 N= 0	$ 91.63 N= 1	$ .00 N= 0	$ 220.63 N= 1	$ 158.21 N= 127
42	$ .00 N= 0	$ 276.26 N= 20	$ 339.58 N= 2	$ 252.69 N= 22	$ 286.89 N= 15	$ .00 N= 0	$ .00 N= 0	$ 107.07 N= 3	$ .00 N= 0	$ 253.34 N= 1	$ 264.15 N= 63
48	$ .00 N= 0	$ 248.71 N= 17	$ .00 N= 0	$ 197.66 N= 10	$ 256.20 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 266.78 N= 1	$ 231.99 N= 29

TABLE D.5 (Continued)

54	$ .00 N= 0	$ 278.46 N= 3	$ .00 N= 0	$ .00 N= 0	$ 117.62 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 238.25 N= 4
60	$ .00 N= 0	$ 362.04 N= 39	$ .00 N= 0	$ .00 N= 0	$ 124.99 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 356.11 N= 40
66	$ .00 N= 0	$ 436.82 N= 7	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 436.82 N= 7
72	$ .00 N= 0	$ 470.77 N= 19	$ .00 N= 0	$ .00 N= 0	$ 166.96 N= 3	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 436.25 N= 22

TABLE D.5 SUMMARY

SANITARY SEWERS
AVERAGE COST PER FOOT OF PIPE (NATIONAL)

(NOT STANDARD METROPOLITAN STATISTICAL AREA)

DIAM	UNIT COST	APPURT ($/FT)	NON-CONS ($/FT)	TOTAL COST ($/FT)
04	$ 8.34	$ 1.62	$ 1.10	$ 11.08 (N= 68)
06	$ 12.85	$ 2.97	$ 3.41	$ 19.23 (N= 182)
08	$ 19.40	$ 5.70	$ 5.88	$ 30.99 (N= 899)
10	$ 24.38	$ 8.99	$ 8.50	$ 41.88 (N= 524)
12	$ 27.83	$ 10.28	$ 9.21	$ 47.33 (N= 432)
15	$ 28.18	$ 13.43	$ 11.28	$ 52.89 (N= 199)
16	$ 43.69	$ 14.40	$ 21.20	$ 79.30 (N= 49)
18	$ 34.57	$ 18.15	$ 16.35	$ 69.07 (N= 251)
21	$ 44.34	$ 23.03	$ 22.21	$ 89.59 (N= 133)
24	$ 47.60	$ 23.71	$ 20.87	$ 92.20 (N= 256)
27	$ 54.24	$ 21.19	$ 20.14	$ 95.57 (N= 54)
30	$ 72.61	$ 32.36	$ 28.13	$ 133.11 (N= 125)
36	$ 96.31	$ 36.07	$ 25.82	$ 158.21 (N= 127)
42	$ 183.47	$ 43.09	$ 37.58	$ 264.15 (N= 63)
48	$ 124.29	$ 59.43	$ 48.26	$ 231.99 (N= 29)
54	$ 135.53	$ 59.17	$ 43.53	$ 238.25 (N= 4)
60	$ 202.91	$ 89.66	$ 63.54	$ 356.11 (N= 40)
66	$ 247.89	$ 110.72	$ 78.20	$ 436.82 (N= 7)
72	$ 234.45	$ 117.28	$ 84.51	$ 436.25 (N= 22)

TABLE D.6-A

SANITARY SEWERS
AVERAGE TOTAL COST PER FOOT OF PIPE

(PVC PIPE - DEPTH < 8 FT.)

DIAM	REG 01	REG 02	REG 03	REG 04	REG 05	REG 06	REG 07	REG 08	REG 09	REG 10	NATIONAL
08	$ .00 N= 0	$ .00 N= 0	$ 27.00 N= 5	$ .00 N= 0	$ 24.64 N= 1	$ .00 N= 0	$ .00 N= 0	$ 16.35 N= 1	$ .00 N= 0	$ .00 N= 0	$ 25.14 N= 7
10	$ .00 N= 0	$ .00 N= 0	$ 38.77 N= 2	$ 15.67 N= 3	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 24.91 N= 5
12	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 19.32 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 19.32 N= 2
15	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 27.75 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 27.75 N= 2

TABLE D.6-A SUMMARY

SANITARY SEWERS
AVERAGE COST PER FOOT OF PIPE (NATIONAL)

(PVC PIPE - DEPTH < 8 FT.)

DIAM	UNIT COST	APPURT ($/FT)	NON-CONS ($/FT)	TOTAL COST ($/FT)
08	$ 11.13	$ 6.66	$ 7.34	$ 25.14 (N= 7)
10	$ 13.52	$ 5.67	$ 5.71	$ 24.91 (N= 5)
12	$ 10.65	$ 5.29	$ 3.37	$ 19.32 (N= 2)
15	$ 14.20	$ 8.27	$ 5.27	$ 27.75 (N= 2)

TABLE D.6-B

SANITARY SEWERS
AVERAGE TOTAL COST PER FOOT OF PIPE

(PVC PIPE - DEPTH 8-15 FT.)

DIAM	REG 01	REG 02	REG 03	REG 04	REG 05	REG 06	REG 07	REG 08	REG 09	REG 10	NATIONAL
06	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 17.18 N= 1	$ .00 N= 0	$ .00 N= 0	$ 10.53 N= 5	$ .00 N= 0	$ .00 N= 0	$ 11.63 N= 6
08	$ .00 N= 0	$ .00 N= 0	$ 29.64 N= 16	$ .00 N= 0	$ 98.12 N= 16	$ .00 N= 0	$ .00 N= 0	$ 18.14 N= 12	$ .00 N= 0	$ .00 N= 0	$ 51.40 N= 44
10	$ .00 N= 0	$ .00 N= 0	$ 40.68 N= 7	$ 20.52 N= 15	$ 94.32 N= 6	$ .00 N= 0	$ .00 N= 0	$ 25.21 N= 4	$ .00 N= 0	$ .00 N= 0	$ 39.36 N= 32
12	$ .00 N= 0	$ .00 N= 0	$ 63.32 N= 3	$ 23.39 N= 8	$ 35.92 N= 1	$ 40.05 N= 4	$ .00 N= 0	$ 32.51 N= 4	$ .00 N= 0	$ .00 N= 0	$ 35.16 N= 20
15	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 30.88 N= 7	$ 52.06 N= 1	$ .00 N= 0	$ .00 N= 0	$ 52.45 N= 3	$ .00 N= 0	$ .00 N= 0	$ 38.69 N= 11

TABLE D.6-B SUMMARY

SANITARY SEWERS
AVERAGE COST PER FOOT OF PIPE (NATIONAL)

(PVC PIPE - DEPTH 8-15 FT.)

DIAM	UNIT COST	APPURT ($/FT)	NON-CONS ($/FT)	TOTAL COST ($/FT)	
06	$ 7.09	$ 2.69	$ 1.84	$ 11.63	(N= 6)
08	$ 18.33	$ 23.01	$ 10.06	$ 51.40	(N= 44)
10	$ 15.81	$ 15.42	$ 8.11	$ 39.36	(N= 32)
12	$ 18.58	$ 8.28	$ 8.29	$ 35.16	(N= 20)
15	$ 19.57	$ 9.94	$ 9.16	$ 38.69	(N= 11)

TABLE D.6-C

SANITARY SEWERS
AVERAGE TOTAL COST PER FOOT OF PIPE

(PVC PIPE - DEPTH > 15 FT.)

DIAM	REG 01	REG 02	REG 03	REG 04	REG 05	REG 06	REG 07	REG 08	REG 09	REG 10	NATIONAL
06	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 13.99 N= 1	$ .00 N= 0	$ .00 N= 0	$ 13.99 N= 1
08	$ .00 N= 0	$ .00 N= 0	$ 30.02 N= 3	$ .00 N= 0	$ 116.09 N= 11	$ .00 N= 0	$ .00 N= 0	$ 21.67 N= 8	$ .00 N= 0	$ .00 N= 0	$ 70.02 N= 22
10	$ .00 N= 0	$ .00 N= 0	$ 86.41 N= 1	$ 29.60 N= 9	$ 42.86 N= 6	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 38.12 N= 16
12	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 49.23 N= 4	$ 47.11 N= 4	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 48.17 N= 8
15	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 60.05 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 60.05 N= 1

TABLE D.6-C SUMMARY

SANITARY SEWERS
AVERAGE COST PER FOOT OF PIPE (NATIONAL)

(PVC PIPE - DEPTH > 15 FT.)

DIAM	UNIT COST	APPURT ($/FT)	NON-CONS ($/FT)	TOTAL COST ($/FT)
06	$ 9.63	$ 2.32	$ 2.02	$ 13.99 (N= 1)
08	$ 26.96	$ 32.15	$ 10.90	$ 70.02 (N= 22)
10	$ 27.36	$ 7.22	$ 3.53	$ 38.12 (N= 16)
12	$ 31.12	$ 9.76	$ 7.27	$ 48.17 (N= 8)
15	$ 34.21	$ 16.71	$ 9.12	$ 60.05 (N= 1)

TABLE D.6-D

SANITARY SEWERS
AVERAGE TOTAL COST PER FOOT OF PIPE

(ASBESTOS CEMENT PIPE - DEPTH < 8 FT.)

DIAM	REG 01	REG 02	REG 03	REG 04	REG 05	REG 06	REG 07	REG 08	REG 09	REG 10	NATIONAL
08	$ .00 N= 0	$ 27.47 N= 12	$ 22.56 N= 11	$ 7.14 N= 1	$ 14.53 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 23.62 N= 26
10	$ .00 N= 0	$ 39.34 N= 4	$ 25.51 N= 8	$ 21.53 N= 3	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 28.40 N= 15
12	$ .00 N= 0	$ 69.88 N= 2	$ 35.20 N= 9	$ 25.64 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 39.06 N= 13
15	$ .00 N= 0	$ 72.19 N= 2	$ 38.63 N= 5	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 48.22 N= 7
18	$ .00 N= 0	$ 122.42 N= 2	$ 52.54 N= 6	$ 29.29 N= 1	$ 29.73 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 61.91 N= 10
21	$ .00 N= 0	$ 122.68 N= 2	$ 70.96 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 105.44 N= 3
24	$ .00 N= 0	$ 162.27 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 162.27 N= 1

TABLE D.6-D SUMMARY

SANITARY SEWERS
AVERAGE COST PER FOOT OF PIPE (NATIONAL)

(ASBESTOS CEMENT PIPE - DEPTH < 8 FT.)

DIAM	UNIT COST	APPURT ($/FT)	NON-CONS ($/FT)	TOTAL COST ($/FT)	
08	$ 13.45	$ 5.40	$ 4.76	$ 23.61	(N= 26)
10	$ 14.26	$ 7.05	$ 7.08	$ 28.40	(N= 15)
12	$ 18.07	$ 11.82	$ 9.16	$ 39.06	(N= 13)
15	$ 20.42	$ 16.09	$ 11.69	$ 48.22	(N= 7)
18	$ 21.85	$ 18.89	$ 21.16	$ 61.91	(N= 10)
21	$ 20.89	$ 23.90	$ 60.64	$ 105.44	(N= 3)
24	$ 27.07	$ 36.91	$ 98.27	$ 162.27	(N= 1)

TABLE D.6-E

SANITARY SEWERS
AVERAGE TOTAL COST PER FOOT OF PIPE

(ASBESTOS CEMENT PIPE - DEPTH 8-15 FT.)

DIAM	REG 01	REG 02	REG 03	REG 04	REG 05	REG 06	REG 07	REG 08	REG 09	REG 10	NATIONAL
06	$ 34.64 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 21.15 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 27.90 N= 4
08	$ 28.68 N= 8	$ 34.16 N= 33	$ 27.07 N= 42	$ 8.97 N= 3	$ 20.81 N= 15	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 28.05 N= 101
10	$ 84.74 N= 4	$ 39.30 N= 18	$ 31.05 N= 32	$ 27.08 N= 16	$ 26.47 N= 14	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 33.86 N= 84
12	$ 45.90 N= 8	$ 62.49 N= 18	$ 38.89 N= 30	$ 33.85 N= 15	$ 35.91 N= 4	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 44.13 N= 75
15	$ .00 N= 0	$ 86.81 N= 5	$ 44.14 N= 20	$ 53.83 N= 4	$ 48.37 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 52.54 N= 31
16	$ 111.85 N= 3	$ 43.66 N= 7	$ 48.57 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 106.75 N= 3	$ 72.14 N= 14
18	$ 122.27 N= 6	$ 93.77 N= 13	$ 61.15 N= 24	$ 32.86 N= 4	$ 35.46 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 132.80 N= 2	$ 76.24 N= 51
21	$ .00 N= 0	$ 119.01 N= 12	$ 75.22 N= 4	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 108.07 N= 16
24	$ .00 N= 0	$ 109.93 N= 20	$ 57.58 N= 4	$ .00 N= 0	$ 49.48 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 97.23 N= 26
30	$ .00 N= 0	$ 256.37 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 256.37 N= 2

TABLE D.6-E SUMMARY

SANITARY SEWERS
AVERAGE COST PER FOOT OF PIPE (NATIONAL)

(ASBESTOS CEMENT PIPE - DEPTH 8-15 FT.)

DIAM	UNIT COST	APPURT ($/FT)	NON-CONS ($/FT)	TOTAL COST ($/FT)	
06	$ 16.83	$ 7.81	$ 3.24	$ 27.90	(N= 4)
08	$ 18.14	$ 5.59	$ 4.31	$ 28.05	(N= 101)
10	$ 19.23	$ 8.52	$ 6.10	$ 33.86	(N= 84)
12	$ 22.09	$ 12.69	$ 9.34	$ 44.13	(N= 75)
15	$ 25.60	$ 16.03	$ 10.90	$ 52.54	(N= 31)
16	$ 33.44	$ 13.48	$ 25.21	$ 72.14	(N= 14)
18	$ 31.02	$ 22.62	$ 22.59	$ 76.24	(N= 51)
21	$ 37.20	$ 22.89	$ 47.97	$ 108.07	(N= 16)
24	$ 35.95	$ 22.47	$ 38.80	$ 97.23	(N= 26)
30	$ 45.12	$ 57.68	$ 153.55	$ 256.37	(N= 2)

TABLE D.6-F

SANITARY SEWERS
AVERAGE TOTAL COST PER FOOT OF PIPE

(ASBESTOS CEMENT PIPE - DEPTH > 15 FT.)

DIAM	REG 01	REG 02	REG 03	REG 04	REG 05	REG 06	REG 07	REG 08	REG 09	REG 10	NATIONAL
08	$ 41.08 N= 5	$ 37.59 N= 25	$ 35.83 N= 16	$ .00 N= 0	$ 44.73 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 37.66 N= 48
10	$ .00 N= 0	$ 60.94 N= 17	$ 56.31 N= 15	$ 37.32 N= 7	$ 31.90 N= 7	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 51.42 N= 46
12	$ .00 N= 0	$ 87.13 N= 18	$ 57.40 N= 6	$ 59.22 N= 8	$ 39.71 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 72.53 N= 34
15	$ .00 N= 0	$ 105.42 N= 4	$ 73.66 N= 9	$ 78.42 N= 10	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 81.25 N= 23
16	$ 84.41 N= 2	$ 68.54 N= 3	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 112.84 N= 1	$ 81.21 N= 6
18	$ .00 N= 0	$ 87.29 N= 8	$ 71.01 N= 16	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 137.20 N= 1	$ 78.87 N= 25
21	$ .00 N= 0	$ 162.74 N= 4	$ 96.53 N= 6	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 123.01 N= 10
24	$ .00 N= 0	$ 143.14 N= 7	$ .00 N= 0	$ 158.56 N= 6	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 150.26 N= 13

TABLE D.6-F SUMMARY

SANITARY SEWERS
AVERAGE COST PER FOOT OF PIPE (NATIONAL)

(ASBESTOS CEMENT PIPE - DEPTH > 15 FT.)

DIAM	UNIT COST	APPURT ($/FT)	NON-CONS ($/FT)	TOTAL COST ($/FT)
08	$ 27.22	$ 5.48	$ 4.94	$ 37.66 (N= 48)
10	$ 34.31	$ 9.63	$ 7.47	$ 51.42 (N= 46)
12	$ 40.46	$ 18.55	$ 13.52	$ 72.53 (N= 34)
15	$ 50.96	$ 19.58	$ 10.70	$ 81.25 (N= 23)
16	$ 43.71	$ 11.80	$ 25.69	$ 81.21 (N= 6)
18	$ 40.46	$ 18.47	$ 19.93	$ 78.87 (N= 25)
21	$ 53.63	$ 20.41	$ 48.95	$ 123.01 (N= 10)
24	$ 66.55	$ 43.62	$ 40.09	$ 150.26 (N= 13)

TABLE D.6-G

SANITARY SEWERS
AVERAGE TOTAL COST PER FOOT OF PIPE

(VITRIFIED CLAY PIPE - DEPTH < 8 FT.)

DIAM	REG 01	REG 02	REG 03	REG 04	REG 05	REG 06	REG 07	REG 08	REG 09	REG 10	NATIONAL
06	$ .00 N= 0	$ .00 N= 0	$ 30.23 N= 1	$ .00 N= 0	$ .00 N= 0	$ 11.17 N= 3	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 15.94 N= 4
08	$ 14.97 N= 1	$ 37.26 N= 5	$ 27.53 N= 13	$ 13.91 N= 7	$ 20.95 N= 9	$ 13.26 N= 11	$ 17.46 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 21.46 N= 47
10	$ .00 N= 0	$ 46.03 N= 1	$ 28.10 N= 2	$ 21.56 N= 7	$ 27.21 N= 5	$ 18.62 N= 8	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 23.40 N= 23
12	$ .00 N= 0	$ 76.01 N= 4	$ 28.00 N= 3	$ 21.02 N= 1	$ 33.96 N= 2	$ 25.89 N= 8	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 38.01 N= 18
15	$ .00 N= 0	$ 112.03 N= 2	$ 53.77 N= 4	$ 36.93 N= 2	$ 39.12 N= 1	$ 20.92 N= 3	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 51.24 N= 12
16	$ .00 N= 0	$ 70.02 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 70.02 N= 1
18	$ .00 N= 0	$ 169.05 N= 2	$ 39.88 N= 2	$ 36.91 N= 2	$ 30.55 N= 1	$ 45.87 N= 5	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 62.63 N= 12
21	$ .00 N= 0	$ .00 N= 0	$ 33.25 N= 1	$ .00 N= 0	$ .00 N= 0	$ 53.74 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 46.91 N= 3
24	$ .00 N= 0	$ .00 N= 0	$ 34.65 N= 1	$ 107.64 N= 2	$ .00 N= 0	$ 48.81 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 74.69 N= 4
27	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 70.98 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 70.98 N= 1

TABLE D.6-G SUMMARY

SANITARY SEWERS
AVERAGE COST PER FOOT OF PIPE (NATIONAL)

(VITRIFIED CLAY PIPE - DEPTH < 8 FT.)

DIAM	UNIT COST	APPURT ($/FT)	NON-CONS ($/FT)	TOTAL COST ($/FT)	
06	$ 8.85	$ 1.71	$ 5.36	$ 15.94	(N= 4)
08	$ 12.90	$ 4.77	$ 3.77	$ 21.46	(N= 47)
10	$ 10.98	$ 6.14	$ 6.27	$ 23.40	(N= 23)
12	$ 18.10	$ 8.63	$ 11.27	$ 38.01	(N= 18)
15	$ 22.36	$ 15.49	$ 13.38	$ 51.24	(N= 12)
16	$ 29.04	$ 11.78	$ 29.19	$ 70.02	(N= 1)
18	$ 24.47	$ 21.87	$ 16.28	$ 62.63	(N= 12)
21	$ 25.42	$ 14.26	$ 7.22	$ 46.91	(N= 3)
24	$ 29.52	$ 9.08	$ 36.08	$ 74.69	(N= 4)
27	$ 34.73	$ 23.09	$ 13.15	$ 70.98	(N= 1)

TABLE D.6-H

SANITARY SEWERS
AVERAGE TOTAL COST PER FOOT OF PIPE

(VITRIFIED CLAY PIPE - DEPTH 8-15 FT.)

DIAM	REG 01	REG 02	REG 03	REG 04	REG 05	REG 06	REG 07	REG 08	REG 09	REG 10	NATIONAL
06	$ 33.73 N= 7	$ .00 N= 0	$ 34.35 N= 4	$ .00 N= 0	$ 19.02 N= 3	$ 14.16 N= 7	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 25.23 N= 21
08	$ 39.55 N= 19	$ 42.39 N= 36	$ 32.89 N= 50	$ 17.68 N= 20	$ 27.49 N= 78	$ 19.80 N= 41	$ 18.72 N= 3	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 29.51 N= 247
10	$ 51.90 N= 15	$ 61.46 N= 17	$ 41.30 N= 32	$ 23.06 N= 21	$ 33.11 N= 44	$ 26.09 N= 22	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 37.48 N= 151
12	$ 62.70 N= 12	$ 78.56 N= 23	$ 33.64 N= 13	$ 30.08 N= 9	$ 41.75 N= 53	$ 34.70 N= 33	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 46.33 N= 143
15	$ 85.47 N= 6	$ 117.02 N= 9	$ 65.63 N= 10	$ 39.38 N= 7	$ 43.55 N= 23	$ 26.46 N= 9	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 58.40 N= 64
16	$ .00 N= 0	$ 89.80 N= 8	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 89.80 N= 8
18	$ .00 N= 0	$ 159.60 N= 13	$ 60.70 N= 12	$ 44.59 N= 12	$ 56.81 N= 16	$ 53.54 N= 18	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 73.39 N= 71
21	$ .00 N= 0	$ 192.26 N= 2	$ 57.82 N= 6	$ .00 N= 0	$ 53.07 N= 2	$ 60.66 N= 9	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 72.82 N= 19
24	$ .00 N= 0	$ .00 N= 0	$ 99.02 N= 7	$ 94.90 N= 11	$ 70.86 N= 7	$ 82.33 N= 11	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 87.19 N= 36
27	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 74.04 N= 4	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 74.04 N= 4
30	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 71.51 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 71.51 N= 2
36	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 94.44 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 94.44 N= 1

TABLE D.6-H SUMMA

SANTIARY SEWERS
AVERAGE COST PER FOOT OF PIPE (NATIONAL)

(VITRIFIED CLAY PIPE - DEPTH 8-15 FT.)

DIAM	UNIT COST	APPURT ($/FT)	NON-CONS ($/FT)	TOTAL COST ($/FT)	
06	$ 14.27	$ 5.09	$ 5.85	$ 25.23	(N= 21)
08	$ 18.62	$ 6.00	$ 4.88	$ 29.51	(N= 247)
10	$ 19.42	$ 9.92	$ 8.14	$ 37.48	(N= 151)
12	$ 23.88	$ 12.43	$ 10.01	$ 46.33	(N= 143)
15	$ 26.68	$ 18.51	$ 13.20	$ 58.40	(N= 64)
16	$ 33.89	$ 25.42	$ 30.48	$ 89.80	(N= 8)
18	$ 31.75	$ 24.38	$ 17.26	$ 73.39	(N= 71)
21	$ 36.86	$ 24.10	$ 11.84	$ 72.82	(N= 19)
24	$ 40.63	$ 19.21	$ 27.33	$ 87.19	(N= 36)
27	$ 37.80	$ 23.09	$ 13.15	$ 74.04	(N= 4)
30	$ 34.87	$ 21.28	$ 15.35	$ 71.51	(N= 2)
36	$ 41.67	$ 30.64	$ 22.11	$ 94.44	(N= 1)

TABLE D.6-I

SANITARY SEWERS
AVERAGE TOTAL COST PER FOOT OF PIPE

(VITRIFIED CLAY PIPE - DEPTH > 15 FT.)

DIAM	REG 01	REG 02	REG 03	REG 04	REG 05	REG 06	REG 07	REG 08	REG 09	REG 10	NATIONAL
06	$ .00 N= 0	$ .00 N= 0	$ 62.45 N= 2	$ .00 N= 0	$ .00 N= 0	$ 13.88 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 46.26 N= 3
08	$ 44.73 N= 8	$ 58.12 N= 15	$ 43.03 N= 23	$ 27.88 N= 5	$ 34.53 N= 50	$ 17.95 N= 7	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 38.99 N= 108
10	$ 76.25 N= 6	$ 60.38 N= 1	$ 58.15 N= 9	$ 16.71 N= 1	$ 40.83 N= 29	$ 35.65 N= 4	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 47.69 N= 50
12	$ 74.79 N= 5	$ 72.37 N= 7	$ 47.67 N= 5	$ 47.33 N= 3	$ 55.06 N= 43	$ 59.59 N= 4	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 57.71 N= 67
15	$ 100.73 N= 4	$ 125.09 N= 4	$ 68.91 N= 5	$ .00 N= 0	$ 48.54 N= 5	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 82.81 N= 18
16	$ .00 N= 0	$ 94.39 N= 5	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 94.39 N= 5
18	$ .00 N= 0	$ 227.37 N= 5	$ 50.22 N= 2	$ 51.40 N= 1	$ 71.46 N= 9	$ 51.48 N= 4	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 101.80 N= 21
21	$ .00 N= 0	$ 219.26 N= 3	$ 120.02 N= 6	$ .00 N= 0	$ .00 N= 0	$ 56.05 N= 8	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 107.43 N= 17
24	$ .00 N= 0	$ .00 N= 0	$ 201.33 N= 2	$ 106.75 N= 3	$ 84.94 N= 4	$ 82.73 N= 8	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 101.44 N= 17
27	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 80.16 N= 6	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 80.16 N= 6
30	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 78.46 N= 4	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 78.46 N= 4
36	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 110.26 N= 9	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 110.26 N= 9

TABLE D.6-I SUMMARY

SANITARY SEWERS
AVERAGE COST PER FOOT OF PIPE (NATIONAL)

(VITRIFIED CLAY PIPE - DEPTH > 15 FT.)

DIAM	UNIT COST	APPURT ($/FT)	NON-CONS ($/FT)	TOTAL COST ($/FT)	
06	$ 32.80	$ .76	$ 12.69	$ 46.26	(N= 3)
08	$ 28.26	$ 6.39	$ 4.33	$ 38.99	(N= 108)
10	$ 32.58	$ 8.71	$ 6.39	$ 47.69	(N= 50)
12	$ 40.05	$ 9.44	$ 8.21	$ 57.71	(N= 67)
15	$ 42.18	$ 26.09	$ 14.52	$ 82.81	(N= 18)
16	$ 53.41	$ 11.78	$ 29.19	$ 94.39	(N= 5)
18	$ 46.42	$ 36.67	$ 18.69	$ 101.80	(N= 21)
21	$ 61.81	$ 29.91	$ 15.70	$ 107.43	(N= 17)
24	$ 55.56	$ 20.53	$ 25.34	$ 101.44	(N= 17)
27	$ 43.91	$ 23.09	$ 13.15	$ 80.16	(N= 6)
30	$ 41.82	$ 21.28	$ 15.35	$ 78.46	(N= 4)
36	$ 57.50	$ 30.64	$ 22.11	$ 110.26	(N= 9)

TABLE D.6-J

SANITARY SEWERS
AVERAGE TOTAL COST PER FOOT OF PIPE

(CAST IRON PIPE - DEPTH < 8 FT.)

DIAM	REG 01	REG 02	REG 03	REG 04	REG 05	REG 06	REG 07	REG 08	REG 09	REG 10	NATIONAL
06	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 22.39 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 22.39 N= 1
08	$ .00 N= 0	$ .00 N= 0	$ 27.98 N= 3	$ 12.51 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 24.11 N= 4
10	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 24.63 N= 2	$ 26.93 N= 1	$ 32.13 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 27.08 N= 4
12	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 45.03 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 45.03 N= 2
16	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 43.39 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 43.39 N= 1
24	$ .00 N= 0	$ 99.83 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 109.07 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 104.45 N= 2

TABLE D.6-J SUMMARY

SANITARY SEWERS
AVERAGE COST PER FOOT OF PIPE (NATIONAL)

(CAST IRON PIPE - DEPTH < 8 FT.)

DIAM	UNIT COST	APPURT ($/FT)	NON-CONS ($/FT)	TOTAL COST ($/FT)	
06	$ 19.13	$ 2.29	$ .96	$ 22.39	(N= 1)
08	$ 15.93	$ 5.61	$ 2.56	$ 24.11	(N= 4)
10	$ 16.94	$ 5.91	$ 4.21	$ 27.08	(N= 4)
12	$ 32.01	$ 9.16	$ 3.85	$ 45.03	(N= 2)
16	$ 34.43	$ 3.96	$ 4.99	$ 43.39	(N= 1)
24	$ 54.72	$ 30.69	$ 19.03	$ 104.45	(N= 2)

TABLE D.6-K

SANITARY SEWERS
AVERAGE TOTAL COST PER FOOT OF PIPE

(CAST IRON PIPE - DEPTH 8-15 FT.)

DIAM	REG 01	REG 02	REG 03	REG 04	REG 05	REG 06	REG 07	REG 08	REG 09	REG 10	NATIONAL
06	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 17.98 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 17.98 N= 2
08	$ .00 N= 0	$ .00 N= 0	$ 37.48 N= 11	$ 17.87 N= 4	$ .00 N= 0	$ 33.47 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 32.40 N= 17
10	$ 41.26 N= 2	$ .00 N= 0	$ .00 N= 0	$ 37.76 N= 7	$ .00 N= 0	$ 41.13 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 39.01 N= 11
12	$ 56.02 N= 1	$ .00 N= 0	$ 70.93 N= 1	$ 34.88 N= 2	$ .00 N= 0	$ 47.79 N= 10	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 48.18 N= 14
16	$ 151.67 N= 3	$ .00 N= 0	$ .00 N= 0	$ 45.42 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 109.17 N= 5
18	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 77.14 N= 5	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 77.14 N= 5
24	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 118.33 N= 5	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 118.33 N= 5

TABLE D.6-K SUMMARY

SANITARY SEWERS
AVERAGE COST PER FOOT OF PIPE (NATIONAL)

(CAST IRON PIPE - DEPTH 8-15 FT.)

DIAM	UNIT COST	APPURT ($/FT)	NON-CONS ($/FT)	TOTAL COST ($/FT)	
06	$ 14.72	$ 2.29	$ .96	$ 17.98	(N= 2)
08	$ 22.26	$ 6.66	$ 3.46	$ 32.40	(N= 17)
10	$ 22.49	$ 7.64	$ 8.86	$ 39.01	(N= 11)
12	$ 31.46	$ 11.17	$ 5.54	$ 48.18	(N= 14)
16	$ 52.06	$ 39.33	$ 17.77	$ 109.17	(N= 5)
18	$ 47.84	$ 20.63	$ 8.66	$ 77.14	(N= 5)
24	$ 66.24	$ 36.67	$ 15.41	$ 118.33	(N= 5)

TABLE D.6-L

SANITARY SEWERS
AVERAGE TOTAL COST PER FOOT OF PIPE

(CAST IRON PIPE - DEPTH > 15 FT.)

DIAM	REG 01	REG 02	REG 03	REG 04	REG 05	REG 06	REG 07	REG 08	REG 09	REG 10	NATIONAL
08	$ .00 N= 0	$ .00 N= 0	$ 47.65 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 47.65 N= 1
10	$ .00 N= 0	$ .00 N= 0	$ 60.59 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 60.59 N= 2
12	$ .00 N= 0	$ .00 N= 0	$ 73.30 N= 1	$ 56.26 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 61.94 N= 3
18	$ .00 N= 0	$ .00 N= 0	$ 141.10 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 141.10 N= 1

TABLE D.6-L SUMMARY

SANITARY SEWERS
AVERAGE COST PER FOOT OF PIPE (NATIONAL)

(CAST IRON PIPE - DEPTH > 15 FT.)

DIAM	UNIT COST	APPURT ($/FT)	NON-CONS ($/FT)	TOTAL COST ($/FT)	
08	$ 29.01	$ 13.66	$ 4.96	$ 47.65	(N= 1)
10	$ 30.23	$ 14.38	$ 7.98	$ 60.59	(N= 2)
12	$ 32.65	$ 17.77	$ 11.51	$ 61.94	(N= 3)
18	$ 46.78	$ 69.20	$ 25.11	$ 141.10	(N= 1)

TABLE D.6-M

SANITARY SEWERS
AVERAGE TOTAL COST PER FOOT OF PIPE

(REINFORCED CONCRETE PIPE - DEPTH < 8 FT.)

DIAM	REG 01	REG 02	REG 03	REG 04	REG 05	REG 06	REG 07	REG 08	REG 09	REG 10	NATIONAL
04	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 12.37 N= 1	$ 12.37 N= 1
06	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 14.66 N= 1	$ 14.66 N= 1
08	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 16.68 N= 1	$ 16.68 N= 1
10	$ .00 N= 0	$ 137.42 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 21.64 N= 1	$ 79.53 N= 2
15	$ 116.94 N= 1	$ 195.13 N= 1	$ .00 N= 0	$ 21.77 N= 2	$ 58.50 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 82.82 N= 5
16	$ .00 N= 0	$ 49.09 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 49.09 N= 1
18	$ 158.99 N= 1	$ 288.28 N= 2	$ .00 N= 0	$ 33.47 N= 4	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 124.20 N= 7
21	$ .00 N= 0	$ 185.28 N= 3	$ .00 N= 0	$ 31.45 N= 1	$ 74.73 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 123.46 N= 6
24	$ .00 N= 0	$ .00 N= 0	$ 55.40 N= 2	$ 53.62 N= 5	$ 45.99 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 53.11 N= 8
27	$ .00 N= 0	$ 74.04 N= 1	$ .00 N= 0	$ .00 N= 0	$ 164.81 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 119.43 N= 2
30	$ .00 N= 0	$ 155.17 N= 3	$ 104.49 N= 1	$ 76.63 N= 3	$ 68.75 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 108.58 N= 8
36	$ .00 N= 0	$ 206.08 N= 3	$ 66.30 N= 1	$ 383.44 N= 1	$ 145.93 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 202.32 N= 6
48	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 176.86 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 176.86 N= 1

TABLE D.6-M SUMMARY

SANITARY SEWERS
AVERAGE COST PER FOOT OF PIPE (NATIONAL)
(REINFORCED CONCRETE PIPE - DEPTH < 8 FT.)

DIAM	UNIT COST	APPURT ($/FT)	NON-CONS ($/FT)	TOTAL COST ($/FT)	
04	$ 10.53	$ .83	$ .99	$ 12.37	(N= 1)
06	$ 10.55	$ 1.87	$ 2.24	$ 14.66	(N= 1)
08	$ 9.35	$ 3.32	$ 3.99	$ 16.68	(N= 1)
10	$ 41.33	$ 25.10	$ 13.08	$ 79.53	(N= 2)
15	$ 24.04	$ 38.94	$ 19.83	$ 82.82	(N= 5)
16	$ 37.98	$ 6.50	$ 4.59	$ 49.09	(N= 1)
18	$ 25.18	$ 50.68	$ 48.32	$ 124.20	(N= 7)
21	$ 36.69	$ 38.22	$ 48.54	$ 123.46	(N= 6)
24	$ 24.05	$ 13.82	$ 15.23	$ 53.11	(N= 8)
27	$ 45.97	$ 56.90	$ 16.54	$ 119.43	(N= 2)
30	$ 41.81	$ 26.32	$ 40.43	$ 108.58	(N= 8)
36	$ 59.36	$ 32.18	$ 110.76	$ 202.32	(N= 6)
48	$ 66.97	$ 53.63	$ 56.25	$ 176.86	(N= 1)

TABLE D.6-N

SANITARY SEWERS
AVERAGE TOTAL COST PER FOOT OF PIPE

(REINFORCED CONCRETE PIPE - DEPTH 8-15 FT.)

DIAM	REG 01	REG 02	REG 03	REG 04	REG 05	REG 06	REG 07	REG 08	REG 09	REG 10	NATIONAL
04	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 15.68 N= 3	$ 15.68 N= 3
06	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 17.97 N= 3	$ 17.97 N= 3
08	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 19.99 N= 3	$ 19.99 N= 3
10	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 24.95 N= 3	$ 24.95 N= 3
12	$ 46.16 N= 1	$ .00 N= 0	$ 31.22 N= 4	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 34.20 N= 5
15	$ 117.02 N= 4	$ .00 N= 0	$ 38.46 N= 3	$ 25.02 N= 4	$ 53.92 N= 18	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 57.03 N= 29
16	$ .00 N= 0	$ 70.31 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 70.31 N= 2
18	$ 159.98 N= 7	$ 53.67 N= 5	$ .00 N= 0	$ 37.08 N= 15	$ 65.60 N= 20	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 69.28 N= 47
21	$ 170.69 N= 3	$ 123.29 N= 15	$ .00 N= 0	$ 35.82 N= 4	$ 70.49 N= 27	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 89.96 N= 49
24	$ 241.88 N= 5	$ 130.90 N= 15	$ 77.91 N= 16	$ 54.29 N= 24	$ 75.47 N= 34	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 88.18 N= 94
27	$ .00 N= 0	$ 146.91 N= 9	$ .00 N= 0	$ 59.35 N= 1	$ 123.63 N= 10	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 130.90 N= 20
30	$ 167.82 N= 5	$ 128.23 N= 38	$ 106.47 N= 4	$ 81.78 N= 16	$ 81.59 N= 17	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 110.42 N= 80
36	$ 254.61 N= 3	$ 155.57 N= 45	$ 72.54 N= 4	$ 166.45 N= 17	$ 109.85 N= 19	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 147.40 N= 88
42	$ .00 N= 0	$ 180.05 N= 5	$ .00 N= 0	$ 147.52 N= 11	$ 183.59 N= 12	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 168.79 N= 28
48	$ 445.08 N= 1	$ 208.01 N= 3	$ 120.72 N= 4	$ 182.37 N= 4	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 190.12 N= 12

TABLE D.6-N (Continued)

54	$ .00 N= 0	$ 265.79 N= 1	$ .00 N= 0	$ 236.36 N= 9	$ 126.68 N= 4	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 207.12 N= 14
60	$ .00 N= 0	$ 343.43 N= 16	$ .00 N= 0	$ 271.83 N= 1	$ 230.80 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 327.81 N= 19
66	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 287.48 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 287.48 N= 1
72	$ .00 N= 0	$ 434.20 N= 3	$ 273.27 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 369.83 N= 5

TABLE D.6-N SUMMARY

SANITARY SEWERS
AVERAGE COST PER FOOT OF PIPE (NATIONAL)

(REINFORCED CONCRETE PIPE - DEPTH 8-15 FT.)

DIAM	UNIT COST	APPURT ($/FT)	NON-CONS ($/FT)	TOTAL COST ($/FT)	
04	$ 13.85	$ .83	$ .99	$ 15.68	(N= 3)
06	$ 13.86	$ 1.87	$ 2.24	$ 17.97	(N= 3)
08	$ 12.66	$ 3.32	$ 3.99	$ 19.99	(N= 3)
10	$ 13.50	$ 5.20	$ 6.24	$ 24.95	(N= 3)
12	$ 23.29	$ 5.90	$ 5.00	$ 34.20	(N= 5)
15	$ 27.24	$ 18.30	$ 11.49	$ 57.03	(N= 29)
16	$ 53.82	$ 6.87	$ 9.61	$ 70.31	(N= 2)
18	$ 31.09	$ 22.63	$ 15.55	$ 69.28	(N= 47)
21	$ 41.67	$ 25.63	$ 22.65	$ 89.96	(N= 49)
24	$ 36.50	$ 28.59	$ 23.08	$ 88.18	(N= 94)
27	$ 58.61	$ 40.32	$ 31.96	$ 130.90	(N= 20)
30	$ 48.73	$ 29.27	$ 32.41	$ 110.42	(N= 80)
36	$ 66.61	$ 33.58	$ 47.20	$ 147.40	(N= 88)
42	$ 109.57	$ 31.24	$ 27.98	$ 168.79	(N= 28)
48	$ 77.14	$ 58.21	$ 54.76	$ 190.12	(N= 12)
54	$ 111.08	$ 50.96	$ 45.08	$ 207.12	(N= 14)
60	$ 175.22	$ 89.62	$ 62.96	$ 327.81	(N= 19)
66	$ 121.06	$ 110.76	$ 55.64	$ 287.48	(N= 1)
72	$ 184.13	$ 107.69	$ 78.00	$ 369.83	(N= 5)

TABLE D.6-0

SANITARY SEWERS
AVERAGE TOTAL COST PER FOOT OF PIPE

(REINFORCED CONCRETE PIPE - DEPTH > 15 FT.)

DIAM	REG 01	REG 02	REG 03	REG 04	REG 05	REG 06	REG 07	REG 08	REG 09	REG 10	NATIONAL
10	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 30.22 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 30.22 N= 1
12	$ .00 N= 0	$ .00 N= 0	$ 40.25 N= 1	$ .00 N= 0	$ 32.16 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 36.20 N= 2
15	$ 87.07 N= 2	$ .00 N= 0	$ 45.61 N= 1	$ 31.38 N= 3	$ 56.61 N= 18	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 55.53 N= 24
16	$ .00 N= 0	$ 67.08 N= 5	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 67.08 N= 5
18	$ .00 N= 0	$ 53.36 N= 3	$ .00 N= 0	$ 43.52 N= 6	$ 77.43 N= 25	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 69.32 N= 34
21	$ 120.99 N= 2	$ 200.48 N= 3	$ .00 N= 0	$ 43.30 N= 1	$ 85.58 N= 35	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 94.69 N= 41
24	$ 250.81 N= 5	$ 108.22 N= 14	$ 93.11 N= 11	$ 65.42 N= 16	$ 86.47 N= 38	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 96.74 N= 84
27	$ .00 N= 0	$ 138.95 N= 4	$ .00 N= 0	$ 64.00 N= 2	$ 131.69 N= 24	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 128.15 N= 30
30	$ 215.13 N= 4	$ 182.46 N= 28	$ 121.14 N= 6	$ 94.33 N= 28	$ 117.82 N= 28	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 134.43 N= 94
36	$ 226.64 N= 5	$ 178.70 N= 48	$ 100.23 N= 5	$ 140.03 N= 27	$ 156.58 N= 11	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 163.70 N= 96
42	$ .00 N= 0	$ 298.95 N= 16	$ .00 N= 0	$ 228.37 N= 14	$ 206.93 N= 16	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 245.46 N= 46
48	$ 514.39 N= 4	$ 257.43 N= 14	$ .00 N= 0	$ 214.04 N= 5	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 292.69 N= 23
54	$ .00 N= 0	$ 284.79 N= 2	$ .00 N= 0	$ 279.49 N= 27	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 279.86 N= 29
60	$ .00 N= 0	$ 374.98 N= 23	$ .00 N= 0	$ 265.01 N= 11	$ 283.54 N= 16	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 321.53 N= 50
66	$ .00 N= 0	$ 436.82 N= 7	$ .00 N= 0	$ .00 N= 0	$ 294.83 N= 5	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 377.66 N= 12
72	$ .00 N= 0	$ 487.13 N= 16	$ 278.82 N= 7	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 423.73 N= 23

TABLE D.6-0 SUMMARY

SANITARY SEWERS
AVERAGE COST PER FOOT OF PIPE (NATIONAL)

(REINFORCED CONCRETE PIPE - DEPTH > 15 FT.)

DIAM	UNIT COST	APPURT ($/FT)	NON-CONS ($/FT)	TOTAL COST ($/FT)	
10	$ 28.38	$ .69	$ 1.13	$ 30.22	(N= 1)
12	$ 31.11	$ 2.77	$ 2.30	$ 36.20	(N= 2)
15	$ 35.29	$ 10.60	$ 9.64	$ 55.53	(N= 24)
16	$ 55.97	$ 6.50	$ 4.59	$ 67.08	(N= 5)
18	$ 47.78	$ 11.78	$ 9.75	$ 69.32	(N= 34)
21	$ 45.72	$ 24.13	$ 24.83	$ 94.69	(N= 41)
24	$ 48.46	$ 29.22	$ 19.04	$ 96.73	(N= 84)
27	$ 71.37	$ 41.51	$ 15.25	$ 128.15	(N= 30)
30	$ 68.96	$ 31.08	$ 34.38	$ 134.43	(N= 94)
36	$ 92.30	$ 31.78	$ 39.62	$ 163.70	(N= 96)
42	$ 158.33	$ 41.52	$ 45.60	$ 245.46	(N= 46)
48	$ 140.02	$ 78.80	$ 73.85	$ 292.69	(N= 23)
54	$ 176.16	$ 47.16	$ 56.53	$ 279.86	(N= 29)
60	$ 192.29	$ 70.37	$ 58.85	$ 321.53	(N= 50)
66	$ 212.54	$ 97.35	$ 67.77	$ 377.66	(N= 12)
72	$ 228.68	$ 113.44	$ 81.60	$ 423.73	(N= 23)

TABLE D.6-P

SANITARY SEWERS
AVERAGE TOTAL COST PER FOOT OF PIPE

(DUCTILE IRON PIPE - DEPTH < 8 FT.)

DIAM	REG 01	REG 02	REG 03	REG 04	REG 05	REG 06	REG 07	REG 08	REG 09	REG 10	NATIONAL
08	$ .00 N= 0	$ 35.88 N= 4	$ 36.90 N= 1	$ 15.29 N= 2	$ 32.56 N= 1	$ 42.24 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 31.76 N= 9
10	$ .00 N= 0	$ 25.20 N= 1	$ .00 N= 0	$ 25.90 N= 4	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 25.76 N= 5
12	$ .00 N= 0	$ 78.74 N= 1	$ .00 N= 0	$ 29.17 N= 2	$ 32.59 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 42.47 N= 4
16	$ .00 N= 0	$ 77.85 N= 1	$ .00 N= 0	$ 47.93 N= 3	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 55.41 N= 4
18	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 45.28 N= 3	$ .00 N= 0	$ 61.64 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 49.37 N= 4
24	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 76.33 N= 2	$ .00 N= 0	$ 90.58 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 81.08 N= 3
30	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 138.19 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 138.19 N= 2
36	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 268.16 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 268.16 N= 1
42	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 364.40 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 364.40 N= 1

TABLE D.6-P SUMMARY

SANITARY SEWERS
AVERAGE COST PER FOOT OF PIPE (NATIONAL)

(DUCTILE IRON PIPE - DEPTH < 8 FT.)

DIAM	UNIT COST	APPURT ($/FT)	NON-CONS ($/FT)	TOTAL COST ($/FT)	
08	$ 23.15	$ 4.44	$ 4.16	$ 31.76	(N= 9)
10	$ 19.09	$ 3.10	$ 3.55	$ 25.76	(N= 5)
12	$ 23.04	$ 11.33	$ 8.09	$ 42.47	(N= 4)
16	$ 26.96	$ 12.99	$ 15.45	$ 55.41	(N= 4)
18	$ 29.61	$ 9.45	$ 10.30	$ 49.37	(N= 4)
24	$ 53.62	$ 13.53	$ 13.92	$ 81.08	(N= 3)
30	$ 105.65	$ 16.48	$ 16.05	$ 138.19	(N= 2)
36	$ 206.34	$ 30.17	$ 31.64	$ 268.16	(N= 1)
42	$ 280.26	$ 41.06	$ 43.06	$ 364.40	(N= 1)

TABLE D.6-Q

SANITARY SEWERS
AVERAGE TOTAL COST PER FOOT OF PIPE

(DUCTILE IRON PIPE - DEPTH 8-15 FT.)

DIAM	REG 01	REG 02	REG 03	REG 04	REG 05	REG 06	REG 07	REG 08	REG 09	REG 10	NATIONAL
06	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 38.16 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 38.16 N= 1
08	$ 52.86 N= 4	$ 49.80 N= 14	$ 44.81 N= 2	$ 19.10 N= 1	$ 29.52 N= 3	$ 45.09 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 46.04 N= 25
10	$ 74.49 N= 6	$ 170.99 N= 1	$ .00 N= 0	$ 34.29 N= 7	$ 40.37 N= 2	$ 28.63 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 56.90 N= 17
12	$ 85.17 N= 1	$ 87.39 N= 3	$ .00 N= 0	$ 31.94 N= 1	$ 52.99 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 69.32 N= 7
15	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 55.88 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 55.88 N= 1
16	$ .00 N= 0	$ 80.08 N= 2	$ 75.82 N= 2	$ 47.91 N= 6	$ 74.80 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 61.28 N= 11
18	$ 168.16 N= 3	$ .00 N= 0	$ 88.31 N= 1	$ 61.42 N= 7	$ 75.31 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 91.51 N= 12
24	$ .00 N= 0	$ 104.70 N= 2	$ .00 N= 0	$ 105.45 N= 12	$ 148.05 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 108.19 N= 15
30	$ 261.34 N= 1	$ .00 N= 0	$ .00 N= 0	$ 141.82 N= 8	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 155.10 N= 9
36	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 274.32 N= 4	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 274.32 N= 4
42	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 371.71 N= 4	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 371.71 N= 4

TABLE D.6-Q SUMMARY

SANITARY SEWERS
AVERAGE COST PER FOOT OF PIPE (NATIONAL)

(DUCTILE IRON PIPE - DEPTH 8-15 FT.)

DIAM	UNIT COST	APPURT ($/FT)	NON-CONS ($/FT)	TOTAL COST ($/FT)	
06	$ 36.71	$ .88	$ .56	$ 38.16	(N= 1)
08	$ 30.57	$ 7.79	$ 7.67	$ 46.04	(N= 25)
10	$ 32.41	$ 9.87	$ 14.61	$ 56.90	(N= 17)
12	$ 33.36	$ 22.32	$ 13.63	$ 69.32	(N= 7)
15	$ 42.79	$ 4.58	$ 8.50	$ 55.88	(N= 1)
16	$ 32.41	$ 10.51	$ 18.34	$ 61.28	(N= 11)
18	$ 35.37	$ 34.49	$ 21.64	$ 91.51	(N= 12)
24	$ 65.53	$ 25.57	$ 17.08	$ 108.19	(N= 15)
30	$ 109.22	$ 22.51	$ 23.36	$ 155.10	(N= 9)
36	$ 212.50	$ 30.17	$ 31.64	$ 274.32	(N= 4)
42	$ 287.58	$ 41.06	$ 43.06	$ 371.71	(N= 4)

TABLE D.6-R

SANITARY SEWERS
AVERAGE TOTAL COST PER FOOT OF PIPE

(DUCTILE IRON PIPE - DEPTH > 15 FT.)

DIAM	REG 01	REG 02	REG 03	REG 04	REG 05	REG 06	REG 07	REG 08	REG 09	REG 10	NATIONAL
08	$ .00 N= 0	$ 93.73 N= 8	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 93.73 N= 8
10	$ 86.19 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 52.00 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 74.79 N= 3
12	$ 88.37 N= 1	$ 119.41 N= 3	$ .00 N= 0	$ .00 N= 0	$ 63.51 N= 6	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 82.76 N= 10
16	$ .00 N= 0	$ .00 N= 0	$ 81.63 N= 2	$ 76.88 N= 3	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 78.78 N= 5
18	$ .00 N= 0	$ 288.66 N= 1	$ 91.49 N= 1	$ 93.56 N= 5	$ 81.61 N= 1	$ 68.12 N= 10	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 89.48 N= 18
24	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 153.33 N= 12	$ 115.22 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 150.40 N= 13
30	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 107.39 N= 3	$ 144.83 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 122.37 N= 5
36	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 282.02 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 282.02 N= 1
42	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 389.81 N= 4	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 389.81 N= 4

TABLE D.6-R SUMMARY

SANITARY SEWERS
AVERAGE COST PER FOOT OF PIPE (NATIONAL)

(DUCTILE IRON PIPE - DEPTH > 15 FT.)

DIAM	UNIT COST	APPURT ($/FT)	NON-CONS ($/FT)	TOTAL COST ($/FT)	
08	$ 76.93	$ 9.01	$ 7.79	$ 93.73	(N= 8)
10	$ 36.54	$ 6.74	$ 31.50	$ 74.79	(N= 3)
12	$ 51.82	$ 18.70	$ 12.23	$ 82.76	(N= 10)
16	$ 42.39	$ 18.35	$ 18.04	$ 78.78	(N= 5)
18	$ 50.13	$ 20.41	$ 18.93	$ 89.48	(N= 18)
24	$ 80.00	$ 45.80	$ 24.59	$ 150.40	(N= 13)
30	$ 70.75	$ 24.58	$ 27.03	$ 122.37	(N= 5)
36	$ 220.20	$ 30.17	$ 31.64	$ 282.02	(N= 1)
42	$ 305.67	$ 41.06	$ 43.06	$ 389.81	(N= 4)

TABLE D.6-S

SANITARY SEWERS
AVERAGE TOTAL COST PER FOOT OF PIPE

(OTHER PIPE - DEPTH < 8 FT.)

DIAM	REG 01	REG 02	REG 03	REG 04	REG 05	REG 06	REG 07	REG 08	REG 09	REG 10	NATIONAL
08	$ .00 N= 0	$ .00 N= 0	$ 22.75 N= 1	$ .00 N= 0	$ 16.28 N= 3	$ 14.78 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 16.86 N= 6
10	$ .00 N= 0	$ .00 N= 0	$ 32.15 N= 1	$ .00 N= 0	$ 21.64 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 25.28 N= 3
12	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 26.44 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 26.44 N= 2
15	$ .00 N= 0	$ .00 N= 0	$ 65.35 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 65.35 N= 1
18	$ .00 N= 0	$ .00 N= 0	$ 108.00 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 108.00 N= 1
24	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 85.63 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 85.63 N= 1

TABLE D.6-S SUMMARY

SANITARY SEWERS
AVERAGE COST PER FOOT OF PIPE (NATIONAL)

(OTHER PIPE - DEPTH < 8 FT.)

DIAM	UNIT COST	APPURT ($/FT)	NON-CONS ($/FT)	TOTAL COST ($/FT)
08	$ 8.41	$ 5.45	$ 2.99	$ 16.86 (N= 6)
10	$ 11.20	$ 9.77	$ 4.30	$ 25.28 (N= 3)
12	$ 10.00	$ 11.07	$ 5.36	$ 26.44 (N= 2)
15	$ 15.70	$ 22.24	$ 27.39	$ 65.35 (N= 1)
18	$ 36.51	$ 32.03	$ 39.44	$ 108.00 (N= 1)
24	$ 24.90	$ 41.95	$ 18.76	$ 85.63 (N= 1)

TABLE D.6-T

SANITARY SEWERS
AVERAGE TOTAL COST PER FOOT OF PIPE

(OTHER PIPE - DEPTH 8-15 FT.)

DIAM	REG 01	REG 02	REG 03	REG 04	REG 05	REG 06	REG 07	REG 08	REG 09	REG 10	NATIONAL
06	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 19.45 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 19.45 N= 2
08	$ .00 N= 0	$ .00 N= 0	$ 29.56 N= 2	$ .00 N= 0	$ 22.67 N= 22	$ 21.50 N= 4	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 23.00 N= 28
10	$ .00 N= 0	$ .00 N= 0	$ 36.82 N= 4	$ .00 N= 0	$ 28.39 N= 20	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 29.79 N= 24
12	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 31.88 N= 13	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 31.88 N= 13
15	$ .00 N= 0	$ .00 N= 0	$ 70.57 N= 3	$ .00 N= 0	$ 45.72 N= 6	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 54.01 N= 9
18	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 59.32 N= 7	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 59.32 N= 7
21	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 57.90 N= 4	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 57.90 N= 4
24	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 82.29 N= 9	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 82.29 N= 9
27	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 105.08 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 105.08 N= 2
30	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 98.35 N= 2	$ 105.03 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 101.69 N= 4
36	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 157.03 N= 6	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 157.03 N= 6
42	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 187.94 N= 3	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 187.94 N= 3
60	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 298.51 N= 3	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 298.51 N= 3

TABLE D.6-T SUMMARY

SANITARY SEWERS
AVERAGE COST PER FOOT OF PIPE (NATIONAL)

(OTHER PIPE - DEPTH 8-15 FT.)

DIAM	UNIT COST	APPURT ($/FT)	NON-CONS ($/FT)	TOTAL COST ($/FT)	
06	$ 14.75	$ 3.65	$ 1.04	$ 19.45	(N= 2)
08	$ 14.94	$ 5.51	$ 2.54	$ 23.00	(N= 28)
10	$ 16.74	$ 9.07	$ 3.98	$ 29.79	(N= 24)
12	$ 16.02	$ 11.07	$ 4.78	$ 31.88	(N= 13)
15	$ 22.90	$ 18.28	$ 12.82	$ 54.01	(N= 9)
18	$ 31.41	$ 17.63	$ 10.27	$ 59.32	(N= 7)
21	$ 28.54	$ 11.92	$ 17.43	$ 57.90	(N= 4)
24	$ 35.49	$ 29.77	$ 17.02	$ 82.29	(N= 9)
27	$ 39.54	$ 51.79	$ 13.73	$ 105.08	(N= 2)
30	$ 60.57	$ 25.50	$ 15.60	$ 101.69	(N= 4)
36	$ 62.24	$ 72.73	$ 22.05	$ 157.03	(N= 6)
42	$ 68.77	$ 90.22	$ 28.94	$ 187.94	(N= 3)
60	$ 172.56	$ 55.76	$ 70.17	$ 298.51	(N= 3)

TABLE D.6-U

SANITARY SEWERS
AVERAGE TOTAL COST PER FOOT OF PIPE

(OTHER PIPE - DEPTH > 15 FT.)

DIAM	REG 01	REG 02	REG 03	REG 04	REG 05	REG 06	REG 07	REG 08	REG 09	REG 10	NATIONAL
08	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 27.47 N= 10	$ 31.85 N= 2	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 28.20 N= 12
10	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 40.72 N= 11	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 40.72 N= 11
12	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 52.21 N= 14	$ 55.99 N= 3	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 52.88 N= 17
15	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 63.38 N= 8	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 63.38 N= 8
18	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 60.87 N= 5	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 60.87 N= 5
21	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 50.26 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 50.26 N= 1
24	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 86.67 N= 11	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 86.67 N= 11
27	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 120.33 N= 5	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 120.33 N= 5
36	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 171.74 N= 8	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 171.74 N= 8
42	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 208.28 N= 3	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 208.28 N= 3
54	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 349.90 N= 1	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 349.90 N= 1
60	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 309.31 N= 9	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ .00 N= 0	$ 309.31 N= 9

TABLE D.6-U SUMMARY

SANITARY SEWERS
AVERAGE COST PER FOOT OF PIPE (NATIONAL)

(OTHER PIPE - DEPTH > 15 FT.)

DIAM	UNIT COST	APPURT ($/FT)	NON-CONS ($/FT)	TOTAL COST ($/FT)	
08	$ 20.43	$ 5.67	$ 2.09	$ 28.20	(N= 12)
10	$ 28.86	$ 9.16	$ 2.68	$ 40.72	(N= 11)
12	$ 34.00	$ 13.54	$ 5.33	$ 52.88	(N= 17)
15	$ 36.28	$ 20.90	$ 6.19	$ 63.38	(N= 8)
18	$ 31.74	$ 23.02	$ 6.10	$ 60.87	(N= 5)
21	$ 25.39	$ 18.16	$ 6.70	$ 50.26	(N= 1)
24	$ 42.22	$ 27.10	$ 17.35	$ 86.67	(N= 11)
27	$ 52.53	$ 52.06	$ 15.73	$ 120.33	(N= 5)
36	$ 60.67	$ 87.24	$ 23.82	$ 171.74	(N= 8)
42	$ 69.40	$ 107.78	$ 31.09	$ 208.28	(N= 3)
54	$ 87.76	$ 207.19	$ 54.94	$ 349.90	(N= 1)
60	$ 183.37	$ 55.76	$ 70.17	$ 309.31	(N= 9)

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